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Class TC 773

Book . U35

1902d

57TH CONGRESS, }
1st Session.

SENATE.

{ Doc. 253,
Part 1.

706
3361

HEARINGS

BEFORE THE

SENATE COMMITTEE ON INTEROCEANIC CANALS

ON

H. R. 3110, FIRST SESSION FIFTY-SEVENTH CONGRESS.
IN THREE PARTS.

MARCH 14, 1902.—Ordered to be printed.

THE
OF

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.

TC 773
L35
1902d

APR 12 1902
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158

2-14824

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STATEMENT
OF
M. EDOUARD LAMPRE
BEFORE THE
SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,
UNITED STATES SENATE,
CONSISTING OF
SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL,
TURNER, AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Saturday, January 11, 1902.*

The subcommittee met at 11 o'clock a. m.

Present: Senators Morgan (chairman), Hanna, Mitchell, Turner, and Foster, of Louisiana.

Also Senators Millard, Kittredge, and Harris, members of the committee.

M. Edouard Lampre, secretary-general of the Compagnie Nouvelle du Canal de Panama, and M. Jules Bœufvé, consul of France and chancellor of the French embassy, appeared and were duly sworn by the chairman.

STATEMENT OF M. EDOUARD LAMPRE.

The CHAIRMAN. M. Lampre, what office do you hold in the new Panama Canal Company and how long have you held that office or had any business relation with it?

M. LAMPRE. I am secretary of the new company and I have held the office from the organization of the company; that is, October, 1894.

The CHAIRMAN. From 1894?

M. LAMPRE. From October, 1894.

The CHAIRMAN. Were you in any way connected with the first Panama Canal Company, and, if so, in what way and to what extent?

M. LAMPRE. Yes, Senator, I have been connected with the old company from 1886 to the failure of the company. My duties were those of legal agent.

Senator TURNER. Your duties were those of a legal character, you say?

M. LAMPRE. Yes, sir; of a legal character.

The CHAIRMAN. You were counsel to the company?

M. LAMPRE. Counsel to the company—legal agent for the company itself. I was in the legal department of the company.

The CHAIRMAN. Not a mere attorney, but you were counsel?

M. LAMPRE. Exactly.

The CHAIRMAN. What are your duties as secretary of the canal company, and what right of access have you, as secretary or otherwise, to the official books, papers, and correspondence of the directors of the company or of its managers?

M. LAMPRE. I have access to the records and archives of the company. All goes through me.

The CHAIRMAN. Are you or have you been admitted to the sittings, conferences, and consultations of the directors and managers or superintendents of the Panama Canal Company, and for how long?

M. LAMPRE. I do not sit at the meetings of the board of the com-

pany. I get directions and instructions from the board and from the management.

The CHAIRMAN. In the period you have been associated with the company in the character that you mention, is there any important action of the directors or other general officers of the company that has been withheld from you or has escaped your knowledge or observation?

M. LAMPRE. Not that I know of, Senator.

The CHAIRMAN. Are you in a general or particular sense informed as to all such matters?

M. LAMPRE. Most generally; unless absolutely confidential matters, which the board may deem fit to keep for itself.

The CHAIRMAN. If the United States Congress should take over the franchises and property of the Panama Canal Company and its concessions from Colombia, Congress will require to be informed of the entire history of the transactions of the company in every material matter, especially as to its outstanding agreements and obligations with all persons whatever. Do you feel free to state all these transactions, or able to state them, as far as you know or believe them to exist, and, in that sense, are you willing to answer in your deposition before this committee?

M. LAMPRE. I am quite willing to answer to the best of my ability.

The CHAIRMAN. What were the instructions under which you were sent to Washington to propose a sale of the canal and railroad to the United States? Please present your credentials and letter of authority to the committee.

M. LAMPRE. I have no credentials whatever. My instructions were only to come to this country and ascertain from the President of the Isthmian Canal Commission under what form and conditions an offer which the company was about to make should be sent direct from Paris to the Commission. When I landed here I found that such an offer had been in fact made, not in a formal form at the time, but to be confirmed and made a few days later in its formal shape. My only task then was to ascertain from Admiral Walker, the President of the Isthmian Canal Commission, under what official formal shape the offer should be made to the United States. That task is accomplished with Admiral Walker, and the offer, as you may know, has been sent two days ago from Paris in the shape of a cable from the president of the board of the company, this cable to be confirmed by letter, a copy of the cable being at the present time deposited with the United States Ambassador in Paris to make it authentic.

The CHAIRMAN. In your conferences with Admiral Walker did you ask him to formulate the precise document or paper upon which the Government of the United States would be willing to accept the offer of the Panama Canal Company?

M. LAMPRE. I have no authority to ask anything from Admiral Walker, but I may state that, of course, the offer would not have been made unless we expected and hoped that the Commission would be called by Admiral Walker and would send to the President of the United States an additional report in which it would embody its opinion as to the new proposal of the company.

The CHAIRMAN (to the stenographer). Please read the answer. I wish to see if I understand it.

The answer was read by the stenographer.

M. LAMPRE. I wish, if possible, to strike out the word "new." Of course, to the present time I do not deem that any definite proposal had been made. The proposal has just been made now, but before this time there was in fact no definite proposal as to the sale of the company's property to the United States.

The CHAIRMAN. Then, if I understand you, no definite proposal has been made.

M. LAMPRE. It has been now, Senator; it had not been before.

The CHAIRMAN. It had not been made up to this time?

M. LAMPRE. At this present time an official and definite proposal has been made.

The CHAIRMAN. How?

M. LAMPRE. To Admiral Walker by cable, sent direct from Paris to him, a copy of that cable being deposited with the United States Ambassador in Paris, and the same proposal and offer being confirmed by letter which is now on its way. But the cable has its authentic character by the deposit of the copy of the same into the hands of the United States ambassador.

The CHAIRMAN. Did you come here as the agent of the Panama Canal Company to present a proposition to the Government of the United States?

M. LAMPRE. No, Senator; as I just stated, I had no power to that effect. My sole instructions were to ascertain from Admiral Walker under what form the offer should be made, and that is what I have accomplished. Under the advice of Admiral Walker himself, we shaped out a form according to which the offer should be made, and so it has been made. I was to ascertain, first of all, to whom the offer should be addressed, either to the president of the Commission or to the Secretary of State or to the President of the United States, and Admiral Walker told me the best step would be to send it direct to himself; which has been done.

The CHAIRMAN. Did Admiral Walker show you any authority on the part of this Government to deal with the Panama Railroad or Canal Company for the purchase of that great property?

M. LAMPRE. Not at all. I did not ask him, either.

The CHAIRMAN. You have not seen any such authority?

M. LAMPRE. I have not seen any.

The CHAIRMAN. In dealing with him did you ask him to produce his authority under that?

M. LAMPRE. Of no kind, Senator. I thought the thing was quite understood.

The CHAIRMAN. Do I understand you to say now that Admiral Walker formulated what would be the proposition you were to make?

M. LAMPRE. We talked about it, and I stated my intention to cable to Paris after the conversation with Admiral Walker as to the form under which the proposal should be made.

The CHAIRMAN. What form did you cable to Paris?

M. LAMPRE. "Send direct cable to Admiral Walker stating that the company makes a definite proposal of sale to the United States of all its property whatever, without any exception or reservation, for the amount of \$40,000,000, covering everything. Copy of this cable of that offer to remain in vigor, to hold good up to the end of the present Congress—that is to say, March 4, 1903. A copy of this cable"—that is what I cabled to Paris, you understand, Senator—"to be depos-

ited immediately with the American ambassador, the cable to be confirmed by letter as soon as possible." I understand that this has been accomplished. The cable has been sent to Admiral Walker. A copy of it has been deposited with the United States ambassador, and also a copy of the letter sent to Admiral Walker confirming the cable, and it is now on its way.

The CHAIRMAN. And that is all you know about it?

M. LAMPRE. That is all I know about it, Senator.

The CHAIRMAN. So we are to wait now until the end of this Congress for this proposal to be arranged to suit you and Admiral Walker?

M. LAMPRE. That is no business of mine.

Senator HANNA. I did not understand that he said we were to wait until the end of this Congress.

The CHAIRMAN. That is what he said.

Senator HANNA. It remains open for our action and binds the company for that time.

M. BŒUFVÉ. They are bound.

Senator MITCHELL. Until the end of this Congress to accept it?

M. LAMPRE. Quite so. We bind ourselves up to the end of this Congress.

The CHAIRMAN. What were to be the terms of the sale?

M. LAMPRE. Forty million dollars, covering every property of the company.

The CHAIRMAN. When payable?

M. LAMPRE. Nothing has been said as to the payment to the present time.

The CHAIRMAN. That is entirely indefinite?

M. LAMPRE. Entirely indefinite, according to what steps will be taken here.

The CHAIRMAN. That term being left indefinite, it would probably require some negotiations hereafter to arrange the period of the payment and to advise us on that point?

M. LAMPRE. Most likely.

The CHAIRMAN. You spoke of the copy being left with the American ambassador in Paris?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Was that left as an official paper?

M. LAMPRE. Exactly; signed by the president of the board.

The CHAIRMAN. Did the president of the company have the authority of the Government of France to deposit that official paper?

M. LAMPRE. Not from the Government of France, but he has full authority from the stockholders' meeting, which was held on the 21st of December last. We had a stockholders' meeting then, and the stockholders' meeting approved of a resolution for the company to negotiate with the United States Government.

The CHAIRMAN. I was speaking of the Government of France.

M. LAMPRE. The Government of France has nothing to do with the question at all. We have a private company bound in no way whatever with the Government of France, only bound to act under the laws of the country, and the laws of the country are that whatever step a private corporation takes it is well and good when confirmed and approved of by the stockholders' meeting.

The CHAIRMAN. Whatever they choose to do they can do if the stockholders' meeting approves it?

M. LAMPRE. Quite so.

The CHAIRMAN. That is your idea of the laws of France?

M. LAMPRE. Exactly.

The CHAIRMAN. There is no limit upon their power except what the stockholders may choose to impose?

M. LAMPRE. Exactly; unless, of course, they do something against the law, which is not the case.

The CHAIRMAN. Please produce a copy of the charters granted to the old or first company or the new canal company by the Government of France and all amendments thereto that have been enacted.

M. LAMPRE. I have not any charters of the old company. I have only the statutes, by-laws, and charter—that is what we call statutes—of the new company. I have not got them with me. They will be at the disposition of the committee whenever they require them. At least, I think I have them. Anyhow I might get them from Paris, to be left with the committee.

The CHAIRMAN. Does that charter expressly authorize this company to sell its concession?

M. LAMPRE. No; it does not.

The CHAIRMAN. While that charter stays in force can this company sell its concessions without an act of the French Congress?

M. LAMPRE. Quite so. Under the general laws of France the stockholders' meeting is the only authority to investigate into the action of private corporations and to give them authority.

The CHAIRMAN. Then a stockholders' meeting can acquire by their act authority to dispose of their property to anybody without the consent of the Government?

M. LAMPRE. That is quite the fact. The Government has nothing whatever to do with private corporations.

The CHAIRMAN. It is a surprising statement to me, at all events, as an American lawyer, that any corporation can exceed the bounds of its authority and can dispose of its entire property to any person anywhere, at any time, and for any consideration without the authority or assistance of any act of the legislature or the consent of the Government.

M. LAMPRE. Nothing whatever of the kind is required. Corporations are quite free in France and independent of the Government. It has been so from the year 1867.

The CHAIRMAN. So that if this company is prohibited by the concession from disposing of its property to the United States it can still do so under the laws of France?

M. LAMPRE. It can absolutely, without any impediment whatever.

The CHAIRMAN. Then, under such circumstances, the law of France could nullify the law of Colombia without any sort of responsibility?

M. LAMPRE. That is quite another matter, to my understanding. There is one thing, the relations between the private corporation, which we are here, and the laws of France, which are as I just stated. Another thing is the agreements between the Colombian Government and our company. These we have to deal with, and, of course, get authority, which we have, as you know, from the Colombian Government to transfer our concession, without infringing on the concession law. That, as you well know, has been given by the minister here in Washington in May last to the president of the company.

The CHAIRMAN. We will inquire further hereafter as to what I

know from any authority from the Government of Colombia. You will produce before the committee, you say, the new charter and the by-laws?

M. LAMPRE. I will, if the committee requires it.

The CHAIRMAN. Are they translated into English?

M. LAMPRE. I have not a translation with me here. I do not know whether the Commission has it or not. I suppose Admiral Walker has one.

The CHAIRMAN. You say you propose to turn over to the United States all the property of every kind and character?

M. LAMPRE. I do say so.

The CHAIRMAN. In France and on the Isthmus?

M. LAMPRE. Yes.

The CHAIRMAN. And in Panama?

M. LAMPRE. Yes.

The CHAIRMAN. Or elsewhere?

M. LAMPRE. Yes.

The CHAIRMAN. How much cash is in the treasury that you propose to turn over to us?

M. LAMPRE. Oh, we do not propose to turn over the cash. That is quite another thing.

The CHAIRMAN. That, then, is property you do not propose to turn over?

M. LAMPRE. No.

The CHAIRMAN. I will ask you how much it is, to see what difference it might make in the contract.

M. LAMPRE. I do not know at the present time. It may be ten or fifteen million francs—16,000,000 francs, I believe.

The CHAIRMAN. Actual money in the treasury?

M. LAMPRE. Actual money in the treasury.

The CHAIRMAN. Now?

M. LAMPRE. Yes, now. I may be wrong in the figure, but it is somewhere about that.

The CHAIRMAN. Sixteen million francs?

M. LAMPRE. Sixteen million francs.

The CHAIRMAN. You do not propose to turn that over?

M. LAMPRE. Oh, no, certainly. That has not been contemplated at all, nor aimed at by the Isthmian Canal Commission in any way whatever.

The CHAIRMAN. Are there any other reservations you make?

M. LAMPRE. None.

The CHAIRMAN. Are there any other assets?

M. LAMPRE. No reservation whatever besides that. It has not been even put into the offer because that has never been contemplated.

The CHAIRMAN. You see we have to do some thinking, you know. We can not act on space and air. Was there any proposition to reserve the 16,000,000 francs in your treasury out of the contract?

M. LAMPRE. No, but I understand that the company would not do away with the cash money. It has not entered into the thought of the company at all. I do not know what may be left of that cash when we come to a definite agreement, if we do, with the United States. We will go on with the work, of course, pending the negotiations.

The CHAIRMAN. You expect to have plenty of time to consult over the business?

M. LAMPRE. I expect nothing. I hope it will be done as soon as possible. I do not know. It is for you to know.

The CHAIRMAN. I am sure we do not. In order to ascertain what claim the United States ought to set up for that money, I will ask you from what source that 16,000,000 francs was derived that you say is now in cash in your treasury.

M. LAMPRE. Yes, sir. It is the remains of the capital stock of the company.

The CHAIRMAN. Subscribed?

M. LAMPRE. Subscribed in 1894 by the stockholders, and in no other way.

The CHAIRMAN. Has the money ever been actually paid into the treasury or has it been left in the hands of the stockholders to be paid?

M. LAMPRE. It has been actually paid.

The CHAIRMAN. Do they get interest on it?

M. LAMPRE. No.

The CHAIRMAN. No stockholder gets interest?

M. LAMPRE. No interest at all during the period of the construction of the canal. Of course they would after the canal is constructed and opened.

The CHAIRMAN. They would then get interest on it?

M. LAMPRE. Yes; they would get 5 per cent.

The CHAIRMAN. That is the agreement between your company and the stockholders?

M. LAMPRE. That is the by-laws.

The CHAIRMAN. That is, the new stockholders?

M. LAMPRE. Yes, sir.

The CHAIRMAN. After the company has completed the canal?

M. LAMPRE. Yes, sir.

The CHAIRMAN. The stockholders will get interest upon their subscriptions?

M. LAMPRE. Exactly; they would get interest upon the subscription and a dividend of the benefits.

The CHAIRMAN. How about the old stockholders?

M. LAMPRE. According to the charter the liquidation of the old company—I do not say the old stockholders, because legally they have no right to the benefits of the new company—

The CHAIRMAN. We would rather have the facts—I would, at least—and determine as to your opinion whether it is right or not.

M. LAMPRE. According to the charter and the agreement between the new company and the liquidation of the old company, which, as you know, transferred to us all its rights and property on the Isthmus as well as the concession, it has been agreed that, out of the benefits the canal would procure to the company, 60 per cent would go to the liquidation of the old company, the new company retaining only 40 per cent. This 60 per cent, to complete my statement, would be divided by the liquidator, the receiver of the old company, between the holders of the interests he represents. But I understand that legally, as the liquidation of the old company represents both stockholders and bondholders, of course the bondholders, being creditors, would have to be paid by the liquidator before the stockholders, who were only associates, would get anything at all. They do not expect it. That is the legal point.

The CHAIRMAN. Now, I wish to get at some facts about this matter. Are there any bondholders?

M. LAMPRE. Of the old company?

The CHAIRMAN. Of the old company.

M. LAMPRE. Oh, yes, sir.

The CHAIRMAN. In what amount?

M. LAMPRE. I do not know the number of bondholders, but the amount of money issued as bonds, to my recollection, is about 800,000,000 francs. Now, I may be mistaken in the figure. It is at least that.

The CHAIRMAN. Those bonds are bonds of the old company?

M. LAMPRE. Exactly.

The CHAIRMAN. And are all outstanding in France——

M. LAMPRE. That is the case.

The CHAIRMAN. And elsewhere?

M. LAMPRE. That is the case. It may be more than 800,000,000 francs. I have not here the figures.

The CHAIRMAN. Besides that were there stockholders who did not hold any bonds?

M. LAMPRE. Yes; there may be. They may be at the same time stockholders and bondholders.

The CHAIRMAN. There may be at the same time preferred stockholders?

M. LAMPRE. We have no preferred stockholders; we have only stockholders.

The CHAIRMAN. In what amount?

M. LAMPRE. Three hundred million francs. That was the creation of the old company.

The CHAIRMAN. About what is the number of those stockholders?

M. LAMPRE. Let me see. There were shares at 500 francs. So it is easy to make the calculation as to the number of shares—that is, 600,000 shares.

The CHAIRMAN. They were all shares of 500 francs?

M. LAMPRE. Of 500 francs.

The CHAIRMAN. One hundred dollars in our currency.

M. LAMPRE. That is all.

The CHAIRMAN. Can you not state the number of stockholders who have been registered on your books?

M. LAMPRE. Do you mean the new company or the old company?

The CHAIRMAN. The old company.

M. LAMPRE. The number of shareholders I can not tell. Of course, I know the amount of shares, but I have no idea as to the number of shareholders.

The CHAIRMAN. It has been represented to me by your counsel that there were 500,000. Is that correct?

M. LAMPRE. It may be; I do not know. I have no idea of it.

The CHAIRMAN. The report of the Isthmian Canal Commission says there are 300,000.

M. LAMPRE. It may be; I do not know at all.

Senator HARRIS. The number is 200,000, the Commission says.

M. LAMPRE. The shares are "to bearer," so we can not know. Most of these shares are shares to bearers; so we can not know, nor can any one know.

The CHAIRMAN. Are the transfers of those stocks required to be registered on the books of the company?

M. LAMPRE. That stock has not been transferred to the new company.

The CHAIRMAN. No; are the transfers of stock required by your by-laws to be registered?

M. LAMPRE. Yes, sir; as concerns registered shares.

The CHAIRMAN. Must they be registered in your company?

M. LAMPRE. Not in ours, in the old company's books.

The CHAIRMAN. They pass like a negotiable instrument then, by delivery?

M. LAMPRE. Yes; when they are to the bearer.

The CHAIRMAN. Do these stocks of the old company bear interest?

M. LAMPRE. They did while the old company was working.

The CHAIRMAN. On their face? Does the contract bear interest?

M. LAMPRE. Yes.

The CHAIRMAN. At what rate?

M. LAMPRE. Five per cent.

The CHAIRMAN. Per annum?

M. LAMPRE. Exactly.

The CHAIRMAN. That contract has never been changed in any way?

M. LAMPRE. No.

The CHAIRMAN. So that all those outstanding stocks, if they are worth anything at all, when they come to be realized upon, have to be accounted for with interest at 5 per cent per annum?

M. LAMPRE. I do not know what the liquidator would do about that or what he would be required to do. I do not know at all. The old company has failed, you know. So, of course, the interest on the stock has been suspended from the time of the failure. That is the law.

The CHAIRMAN. Are these stocks held in larger part or exclusively in France?

M. LAMPRE. Do you mean the old stock?

The CHAIRMAN. I mean the old stock.

M. LAMPRE. They are held, I suppose, mostly in France.

The CHAIRMAN. It seems, from accounts that are given in reports sent to the President of the United States by your company, that this matter has gone into court and that a liquidator has been appointed.

M. LAMPRE. He has. You speak, of course, at the present time of the old company, Senator?

The CHAIRMAN. Whom does that liquidator represent?

M. LAMPRE. The old company.

The CHAIRMAN. The company or the stockholders?

M. LAMPRE. The stockholders and the company, too. It is the same thing with us in France.

The CHAIRMAN. The liquidator represents both?

M. LAMPRE. Yes.

The CHAIRMAN. Did you have a receiver besides?

M. LAMPRE. No; the liquidator is the receiver.

The CHAIRMAN. He is the receiver?

M. LAMPRE. At the same time.

Senator MITCHELL. That officer is the same as the receiver?

M. LAMPRE. Exactly.

The CHAIRMAN. He was made an officer by that appointment, of course?

M. LAMPRE. Exactly. We are speaking of the old company, are we not?

The CHAIRMAN. I am speaking of the old company. By what

authority did this liquidator derive the power or the right to represent the old stockholders?

M. LAMPRE. By a judgment of the court and by the law itself.

The CHAIRMAN. Which law?

M. LAMPRE. The law of France on corporations. Whenever a corporation fails in France, it has to be put into the hands of a receiver, that receiver having the authority which is set forth in the law, and moreover a special authority given him by the judgment.

The CHAIRMAN. Can you cite the committee to the book in which we can find those statutes?

M. LAMPRE. No. The old company might have them. I have nothing here.

The CHAIRMAN. If you can give us the citation we can get the book.

M. LAMPRE. I guess the Commission has it.

The CHAIRMAN. I am not asking about what the Commission has. This committee wants it.

M. LAMPRE. It might be got from the old company.

The CHAIRMAN. I should like to know the volume in which that law appears.

M. LAMPRE. Oh, you mean the French law?

The CHAIRMAN. Yes.

M. LAMPRE. That might be got easily. I can have it sent from Paris here.

The CHAIRMAN. No, we have it here.

M. LAMPRE. You have got it?

The CHAIRMAN. Yes; it is in the Library. All your books are in the Library here. What the committee now want is a citation to the book where we can find this law that you speak of.

M. LAMPRE. Oh, it is the law of July 24, 1867.

Senator MITCHELL. Can you designate the volume?

M. LAMPRE. It is the Commercial Code. It is the general law of corporations amended, I must add, by another law, dated August 1, 1893.

Senator TURNER. The Code that you speak of embraces the original law as well as the amendment?

M. LAMPRE. Exactly.

The CHAIRMAN. Did this liquidation take place under the general laws or under a special law?

M. LAMPRE. The general law of France; but I must add a special law has been passed at the date of July 1, 1893, giving, as to the liquidation of the Panama Canal Company, certain additional powers to the liquidator of the same company on account of the immensity of the interests involved in the whole business and the difficulty.

The CHAIRMAN. The French Chambers—I call it Parliament—the French Parliament took up the subject and passed a special law?

M. LAMPRE. That is the case.

The CHAIRMAN. In reference to this particular corporation?

M. LAMPRE. Exactly so, sir.

The CHAIRMAN. And that law is dated the 1st day of July, 1893?

M. LAMPRE. Yes, sir.

A copy of the law referred to (act of July 1, 1893) was handed to the stenographer, to be inserted in the record, as follows:

AN ACT relative to the liquidation of the Universal Company of the Panama Inter-oceanic Canal.

The Senate and the Chamber of Deputies have adopted and enacted, and the President of the Republic promulgates, the following law:

ART. 1. From the date of the promulgation of the present law all actions now in course of procedure that have been brought by holders of bonds or obligations emitted by the Universal Company of the Panama Interoceanic Canal, or that have been brought by any creditors of the said company, whether against the receiver in his official capacity, or against the directors to enforce their responsibility, or against third parties for restitution, or arising in any other manner whatsoever, are hereby declared discontinued and suspended.

The plaintiff may follow up and prosecute said actions only by complying with the requirements of articles 2 and 3 hereof.

All proceedings concerning attachments and execution, even those now in course of enforcement and procedure, against the personal or real estate or property of the said company are likewise discontinued and suspended.

I.

BOND OR OBLIGATION HOLDERS' ATTORNEY.

ART. 2. All rights of action, of any character whatever, accruing to owners of obligations emitted by the Universal Company of the Panama Interoceanic Canal, whether against the receiver in his official capacity, or against the directors to enforce their responsibility, or for a right to restitution arising from any other cause, shall be enforced and sued on by an attorney or representative appointed for the purpose, on request of the Commonwealth's attorney for the jurisdiction of the civil tribunal of the Seine, by a decree in chambers.

In case there should arise a divergence or opposition of interests between the different classes of bondholders, one or more special attorneys may be appointed in the manner and form just above provided for. The powers of the attorneys aforesaid may be revoked at the same request and in the same manner. There shall be no appeal from said orders or decrees.

However, any obligation holder shall have the right to enter an action for damages in connection with a criminal matter, or to intervene in proceedings instituted by the attorney or representative aforesaid, doing so at his own expense and cost, without in any way delaying the proceedings or judgments.

Moreover, every obligation holder shall have the power to bring any action, in his individual right and at his own risk and peril, which the attorney shall have refused or failed to enter within one month after he shall have been notified and requested to enter the same.

Suits brought by the attorneys or representatives shall not block the right of action on the part of the company belonging to the receiver. The attorneys shall have power to call on the receiver for communication of all documents tending to shed light on the truth. Their legal residence shall be the jurisdiction within which shall be carried on the winding up or liquidation of the company's affairs. The tax costs arising from the exercise of their official duties shall be defrayed from the credits of the receivership, so far as this may be done without impairing the reimbursement to the latter of the sums which it shall have advanced.

ART. 3. All actions emanating from the receiver or from the attorneys or from interested parties individually shall be brought before the civil tribunal of the Seine. Such proceedings as may arise from the distribution of the credits or balance remaining in favor of the company shall be brought likewise before this tribunal. Suits instituted by parties intervening in damages shall remain in the jurisdiction where already the prosecution has been inaugurated.

ART. 4. The attorney shall have full and complete enjoyment of the "judicial assistance privilege" (consisting in the exemption from payment of the usual costs attending a judicial proceeding) in the carrying on of actions and in the executing of verdicts or decisions which he shall have obtained. Likewise he shall enjoy the same in all interventions sounding in damages and in the case of all recording taxes which might be otherwise exacted. On his request, presented to the commonwealth's attorney, pleaders, advocates, and sheriffs shall be appointed in the manner and form prescribed by article 13 of the law dated January 22, 1851.

However, the "judicial-assistance privilege" shall not extend to costs of transportation for judges, for government officials, or for experts, nor to the latter's fees, nor to witness taxes. As to stamp duties, costs of recording, and court costs in general, the Treasury shall exact them from the debtor only, after the payment of such judgment as shall have been obtained by the plaintiff attorney.

ART. 5. The attorney shall have power to compromise or to desist from further action, though he may do so only after consulting with three jurists appointed by the commonwealth's attorney; and all compromises or withdrawals of actions shall have to be ratified and approved by judicial decree rendered in chambers.

He alone shall be empowered to levy execution on judgments pronounced by the court or to receive the sums obtained on compromise, whether such compromise have been obtained on his own demand or on that of obligation holders acting in an individual capacity; all sums thus received shall be deposited by him at the deposit bureau, and the receiver shall give him due quittance therefor.

II.

THE RECEIVER.

ART. 6. Before proceeding at all to distribute the credits of the company, the receiver shall publish in the "Journal Officiel" and in the "Journal Officiel (Commune edition)" a notice, calling on all parties interested to produce their claims against the company and the proofs thereof, within the space of six months, under pain of becoming barred from bringing any action on the said claims.

The production of the claims and transmission of proofs in support thereof may be made by simple registered letter.

ART. 7. The receiver shall proceed to verify and to admit said claims in the manner and form prescribed by articles 495 and 497, first paragraph, of the code of commerce.

ART. 8. Should the claim be contested, notice of this fact shall be sent by registered mail to the claimant in question, and the latter shall have a term of three months within which he must institute proceedings before the civil tribunal of the Seine in order to have his claim adjudicated.

Judgment must be pronounced hereon within the space of one

month, as in the case of matters demanding immediate and summary adjudication. An appeal from such decision must be entered within ten days from the notification of said judgment, either to the party in person or at his domicile.

ART. 9. The distribution of all dividends arising from an action brought by the company or from actions brought by the attorney or representative of obligation holders, or from any other source whatever, shall be made by the receiver, who alone shall have competency to receive opposition or objections to the same.

ART. 10. All acts tending to alienate any assets of the company, all contracts entailing a transfer or contribution of the whole or of a part of the assets of the concern, emanating from the receiver of the Universal Company of the Panama Interoceanic Canal, shall be subject to the approval or ratification of the civil tribunal of the Seine, who shall, on the report of one of the justices, pass on the question in open court.

ART. 11. All decrees of approval or ratification rendered in accordance with the preceding article shall be published, within a term of ten days, in the "Journal Officiel" and in the "Journal Officiel (Commune edition)."

This decree may be attacked by a third party, by the shareholders, by the attorney of obligation holders, and by other creditors of the company, within a delay not exceeding one month from the date of the publication aforesaid. The civil tribunal shall adjudicate the question within the space of one month, as in the case of matters demanding an immediate and summary adjudication. The appeal from such decision must be entered within ten days from the time of notification of said judgment to the party in person or at his domicile.

ART. 12. The Universal Company of the Panama Interoceanic Canal, the civil, i. e. nontrading, company formed for the purpose of redeeming the obligations or bonds of the Panama Canal (issue of March, 1888), and the civil or nontrading company for the redemption of the lottery bonds of the Panama Canal, are hereby exempted from the payment of all stamp duties and of all transfer or transmission taxes now due or about to become due on any shares, obligations, or bonds of the said companies.

ART. 13. Beginning with the date of the promulgation of the present law no limitation in bar of actions in damages shall begin to run against the creditors of the Panama Canal Universal Company until the balance remaining to the credit of the company shall have been realized on and entirely distributed.

ART. 14. Shareholders, subscribers, or buyers of stock having acquired title to the same before the company was placed into the hands of a receiver, provided they represent at least one-twentieth of the capital stock, may join a common interest and intrust one or more attorneys or representatives with maintaining any action and with representing them in court.

The present law, deliberated upon and adopted by the Senate and Chamber of Deputies, shall be enforced as a law of the State.

Done at Marly-le-Roi, on the 1st day of July, 1893.

CARNOT.

By the President of the Republic:

E. GUERIN,

The Keeper of the Seals, the Minister of Justice.

P. PEYTRAL,

The Minister of Finance.

The CHAIRMAN. Now, that law is in conflict with some of the laws you have stated here to-day. Therefore it repeals them?

M. LAMPRE. It repeals them.

The CHAIRMAN. This, then, is the law upon which you act?

M. LAMPRE. Yes, upon which the liquidator acts.

The CHAIRMAN. I mean the liquidator, and your company, too?

M. LAMPRE. No, not our company; the liquidator of the old company only.

The CHAIRMAN. You are not superior to this law in any way?

M. LAMPRE. No, but we have nothing to do with it in fact.

The CHAIRMAN. You are bound by it?

M. LAMPRE. Not so.

The CHAIRMAN. The company is not bound by this law?

M. LAMPRE. No, not the company. The liquidator acts under this law; that is to say, whatever the liquidator does he has to do it according to that law, and if there is something in what he does which he thinks fit to submit to the judgment of the court he has to do it. But that does not concern us. We are bound only by the general law of France. This law, I must make it very clear, concerns exactly, only, and clearly the dealings of the liquidator of the old company. It has nothing to do with the new company.

The CHAIRMAN. Have you a separate charter from the Parliament of France for the new company?

M. LAMPRE. We have no government charters in France. Corporations, as I stated in the beginning, are free and independent.

The CHAIRMAN. Under the general law?

M. LAMPRE. Under the general law. We have no government charters.

The CHAIRMAN. So that the general law of France furnishes now all of the knowledge we possess——

M. LAMPRE. That is the fact.

The CHAIRMAN. In regard to the charter powers of your company?

M. LAMPRE. That is the fact.

Senator MITCHELL. The new company?

M. LAMPRE. The new company.

The CHAIRMAN. Except that this act, as far as it interferes with the new company or with any previous enactment of the French Chambers, repeals it.

M. LAMPRE. You mean the law of July 1, 1893?

The CHAIRMAN. Yes.

M. LAMPRE. It has nothing to do with that, I must state again. It has nothing to do with the new company at all.

The CHAIRMAN. It is bound to have. We must have a judgment on that question ourselves.

Senator TURNER. Did the new company get its title from the liquidator or from the old company?

M. LAMPRE. We got the title from the liquidator under that law. The liquidator had to transfer the title under the provisions of that law. But that was his business. He has accomplished it. The court, according to that law, have approved of the transfer of the property of the old company to the new company, and that is all we had to do with the question. We are not bound by that law. We have nothing to get from the court and nothing to ask from the court in any transaction whatever we may put forth or may do.

The CHAIRMAN. The old stockholders have interests, legal or equitable, in the property of the Panama Canal Company, the new company?

M. LAMPRE. I did not say the old stockholders, Senator; I said the bondholders. I said, in general words, the liquidation, because we have nothing to do with the individuals. The only thing we would have to do, if the canal were built, according to our charter, and profits were derived out of it, would be out of one hundred francs to give sixty to the liquidator, and we have nothing whatever more to do with it. It is his own business and not ours.

The CHAIRMAN. That is your view of the law?

M. LAMPRE. It is my view. It is the general law, I may state. There can not be a mistake in France about that.

The CHAIRMAN. I will take the liberty of saying that there are mistakes made by lawyers very often. They are just as apt to be mistaken as others.

M. LAMPRE. I can admit that. I express an opinion on what I know to be truth in France, and of course I have nothing to say on the view here.

The CHAIRMAN. I doubt the correctness of your statement and must be permitted to take the general judgment about a matter of law of this kind.

M. LAMPRE. I understand the thing fully.

The CHAIRMAN. Why is it that your company is bound to pay to the liquidator for the benefit of the old stockholders anything, if you have no obligations?

M. LAMPRE. How is it?

The CHAIRMAN. How is it that the new company is bound to pay of the proceeds of the canal, when completed, any percentage to the liquidator of the old company, and through him to the stockholders of the old company, unless you have some responsibility fixed by law upon you?

M. LAMPRE. Not by the law, Senator, by what we call statutes, and you would call I believe, charter. It includes an article of agreement between the liquidator and the new company, according to which that division of benefit has been agreed upon; that is to say, we agree that when the canal would be open to navigation and profits would be derived out of the operations—we agreed with the liquidator, under an article of agreement which is inserted in our by-laws, upon the division of profits, which I have just stated to you.

Senator FOSTER, of Louisiana. Is that 60 per cent a part of the consideration of the transfer?

M. LAMPRE. Sixty per cent? Yes; it was the consideration of the transfer.

Senator FOSTER, of Louisiana. Sixty per cent will be paid to the representative of the old company?

M. LAMPRE. We have nothing to do with what would be done with that 60 per cent. That is his business, none of ours. We agreed to give him 60 per cent and we have done with it all.

Senator FOSTER, of Louisiana. Was that the consideration or a part of the consideration?

M. LAMPRE. The whole consideration—the whole of it.

The CHAIRMAN. You say that this contract is incorporated in the by-laws of the new company?

M. LAMPRE. It is.

The CHAIRMAN. And is a part of it?

M. LAMPRE. Article five.

The CHAIRMAN. Are those by-laws a part of your charter?

M. LAMPRE. We do not have charters in France.

The CHAIRMAN. I call it a charter.

M. LAMPRE. If you will call it a charter, it is the charter.

The CHAIRMAN. What do you call it?

M. LAMPRE. We call it statutes.

The CHAIRMAN. Is it incorporated there?

M. LAMPRE. It is.

The CHAIRMAN. And becomes a law you are bound to obey?

M. LAMPRE. Exactly; as it is an agreement between the liquidator and ourselves.

The CHAIRMAN. It is as much a law as if it had been enacted in that form by the parliament of France?

M. LAMPRE. Oh, it is an agreement that we must execute, of course.

The CHAIRMAN. I want to get at the precise nature of it. Is it as much obligatory upon you to comply with that agreement as it would be if it had been enacted by the parliament of France?

M. LAMPRE. It could never have been enacted by the parliament of France. It is as binding as possible, if you will let me put it this way.

The CHAIRMAN. I want to know what is possible. Many things that look possible to you appear to me to be impossibilities.

Senator FOSTER, of Louisiana. Let me ask a question along that line. If your company now transfers to this Government this canal, will then this Government assume the obligation to pay the 60 per cent of the benefits?

M. LAMPRE. Not at all, sir; no. I must make this quite clear to the committee, if I can. You understand, of course, that this agreement with the liquidator I was just telling you about, inserted in what we call the statutes and what you are pleased to call the charter, might not apply to the present condition of things; that is to say, it might be claimed by the liquidator that any amount that we would get from the United States for the transfer would have to be divided between the liquidator and ourselves, under certain conditions not definite at the present time.

We claim, and we are right to claim, that we have, according to our statutes, according to the authority given us by the stockholders' meeting, full and complete power to deal with the United States for the transfer of this company's property. But as it has been contended in this country that if we were to deal with the United States Government the interference of the liquidator would absolutely be necessary, we thought it fit and useful to pass (and that was done recently with the liquidation of the old company) an agreement by which this liquidator, as far as he is concerned, and under the authority of the law and of the courts, gives the new company full, complete, and absolute power to deal alone, without his interference, with the United States for the transfer of the concessions and property, and for the amount the company may think fit under the authority of this stockholders' meeting.

The only question that might have been left aside is as to how the amount which we might get from the United States would be divided between the new company and the old company, and that has been

solved under the following conditions: That is to say that we (I mean the liquidator and our company) leave the whole thing to the judgment of an arbitration court, which has been agreed upon between the new company and the liquidator.

However, the question of division of the amount which we might get from the United States has, to my judgment, nothing to do with this country. It is only a matter to discuss and to put straight between the old company and ourselves. However, for your information, I am pleased to say that the subject has been settled, and has been decided to be submitted to a court of arbitration which we have agreed upon.

Senator MITCHELL. May I ask a question just at that point? Suppose the United State accept your offer and pay you \$40,000,000, and then suppose there should be some failure of the arbitration proceeding which would result in the liquidator or those he represents not getting any portion of the \$40,000,000. The United States having obtained the benefit of your property, would not these stockholders have an equitable claim against the United States, through the liquidator?

M. LAMPRE. No, sir; in no way whatever, because according to the terms of the agreement passed between us and the liquidator, and according, moreover, to the legal conditions in France of an arbitration, we, I mean the contracting parties, on the one side the liquidator and on the other side the new company, agree, positively agree, to accept as absolutely binding the decision of the arbitration.

Senator MITCHELL. The United States would have to run the risk of them carrying out that agreement with the liquidator?

M. LAMPRE. No; they would have to run no risk whatever, according to my opinion.

Senator MITCHELL. This is merely a subject of inquiry.

Senator FOSTER, of Louisiana. Let me see if I understand exactly the transaction between the old and the new company. I understand that the old company went into liquidation and a liquidator was appointed.

M. LAMPRE. Exactly.

Senator FOSTER, of Louisiana. Of course he represents the stockholders, creditors, and bondholders?

M. LAMPRE. That is right.

Senator FOSTER, of Louisiana. Representing these parties, he transferred all the right, title, interest, and property of the old concern to your company, and that was duly ratified and homologated by the judgment of the court?

M. LAMPRE. That is the whole subject, sir.

Senator FOSTER, of Louisiana. As the consideration of the transfer, your company was to pay to the liquidator, representing the creditors, bondholders, stockholders, and shareholders, 60 per cent of the benefits of the canal?

M. LAMPRE. That is correct.

Senator FOSTER, of Louisiana. Then, your company purposes to transfer all your right, title, and interest to this Government for, say, \$40,000,000?

M. LAMPRE. Yes.

Senator FOSTER, of Louisiana. Now, what guaranty will your company give, in the event of the purchase of the canal by this Govern-

ment, that the 60 per cent of benefits which the old company was to derive as a consideration will not be a part of the obligation which this Government assumes?

M. LAMPRE. I understand the question.

Senator FOSTER, of Louisiana. I tried to make it clear.

M. LAMPRE. The guaranty we will give is that very agreement I was just telling you about, according to which the liquidator and the old company accepts of the question to be settled, the division of the amount each might get to be settled by a board of arbitration. To my understanding, the division of the amount we might get from the United States has nothing to do with the United States itself. I beg pardon, if I am too crude.

Senator FOSTER, of Louisiana. We think you are perfectly clear.

M. LAMPRE. It is a matter to be settled only and exclusively between the liquidator and our own company. It is settled under the present agreement.

Senator FOSTER, of Louisiana. Under your law has not any creditor or bondholder or any holder of stock the right to go into court and object to any settlement that the liquidator might make?

M. LAMPRE. The liquidator has authority.

Senator FOSTER, of Louisiana. The liquidator, as I understand, has authority, or you have authority, to make this arbitration.

M. LAMPRE. He has authority from the court.

Senator FOSTER, of Louisiana. Under your law, does not his act require a homologation by the court?

M. LAMPRE. I understand your question, Senator. But that thing has been foreseen, and there is at the present time a judgment of the court giving the liquidator that very authority to enter upon that contract, agreement, with the new company, so that the thing is quite clear and certain now. He has got a special judgment, special authority and authorization from the court to enter upon a contract with us.

Senator FOSTER, of Louisiana. To enter upon this arbitration?

M. LAMPRE. An arbitration contract, an agreement, under which we alone would have to deal with the United States.

Senator TURNER. What court is that?

M. LAMPRE. The French court.

Senator TURNER. What is the rank of the court? Is it a court of last resort or is its judgment subject to review by other courts?

M. LAMPRE. The first court.

Senator TURNER. A court of first instance?

M. LAMPRE. Exactly.

Senator TURNER. Then its judgment is subject to review if any stockholder wills to open it up?

M. LAMPRE. It might be, but I do not expect any trouble from that source.

Senator TURNER. Now, let me ask you this question: When you took this canal project over from the liquidator, was it a contract to complete the canal and operate it?

M. LAMPRE. Yes; that was the contract.

Senator TURNER. And to turn over to the old stockholders 60 per cent of the net proceeds?

M. LAMPRE. It was.

Senator TURNER. That was your contract?

M. LAMPRE. It was.

Senator TURNER. If the bonded indebtedness amounts to 800,000,000 francs or more, there would be none of this \$40,000,000 to turn over to the old stockholders at all, that being the first lien, of course?

M. LAMPRE. This is how the thing stands: The stockholders, as I said——

Senator TURNER. The stockholders would be out and injured?

M. LAMPRE. That is a matter for the liquidator to decide.

Senator TURNER. Would they have a standing in some court to come in and say that the liquidator had no authority to contract to turn over this property to a foreign government and cut them out from the possibility of any benefits whatever from the construction and operation of this canal?

M. LAMPRE. Well, you know any claim may always be set forth, but I am convinced——

Senator TURNER. Is it not quite likely that they would urge a claim of that kind?

M. LAMPRE. It might happen, but I am convinced there would be no difficulty about it at all under these conditions.

Senator TURNER. What right would any court have, in justice and equity, to cut these old stockholders out of any possibility of any benefit?

M. LAMPRE. The law itself, sir; because it is the law in France that when a corporation fails the first interests in that corporation to satisfy are the interests of the bondholders. The stockholders, who are only associates, who are debtors to the bondholders, have no right to get anything unless the bondholders are completely disinterested.

Senator TURNER. I understand that; but having failed, the liquidator, in the interest of the stockholders as well as the bondholders, made this contract with the new company. Now, what right has any court to say to that liquidator, "You may make a contract which will cut these stockholders off from any possibility of any benefits whatever?"

M. LAMPRE. The law itself.

Senator TURNER. Does the law give them that right absolutely?

M. LAMPRE. Yes.

Senator TURNER. Without any compensation or consideration to them whatever?

M. LAMPRE. Quite so.

The CHAIRMAN. Colombia, I learn from these papers, holds stock in the Panama Canal Company?

M. LAMPRE. Yes.

The CHAIRMAN. The old company and the new?

M. LAMPRE. Not the old company; the new company; and that is 50,000 shares, or 5,000,000 francs, as provided by extensions of the concession granted in the years 1890 and 1893, making the entire stock of the new company 65,000,000 francs.

The CHAIRMAN. It holds that in its own right as a government?

M. LAMPRE. Yes.

The CHAIRMAN. How is a French court, under this law you speak of, going to deal with Colombia and cut her off from a benefit in this canal?

M. LAMPRE. The court can not cut her off in the amount which we might obtain. In the amount which we might get from the United

States, Colombia would have its proportion as a shareholder of the new company.

The CHAIRMAN. Can a French court decree that Colombia shall receive her share of this sale for \$40,000,000 after the bondholders are satisfied? Can it decree that she, as a stockholder, shall receive her share?

M. LAMPRE. I am afraid there is confusion there, Senator. We are speaking at the present time of the stock the Colombian Government owns in the new company.

The CHAIRMAN. Oh, either company.

M. LAMPRE. As concerns the new company, the same agreement, the same laws, binding all the stockholders, apply to the Colombian Government.

The CHAIRMAN. The question I want to get at is this. You seem to rely upon the power of the French court to confirm this sale that you make and to bind the liquidator, if he agrees to it, to an arbitration, and to bind the old stockholders through the liquidator. You seem to insist on that. Now, Colombia being a sovereign government and one of the stockholders of the old company, I want to know if a court of France can reach Colombia and compel her to abide by its decree.

M. LAMPRE. The court of France has nothing to do with the Colombian Government. Let me make myself clear on this subject. The Colombian Government being, as you know, a stockholder of our company, has at every meeting of the stockholders of our company a representative, who is to vote upon resolutions presented by the board of administration; and the Colombian Government has agreed, as a member of the meeting, to accept what we are about to do with the United States Government, if it is to be done. This has been passed upon by the representative of the Colombian Government in the stockholders' meeting.

The CHAIRMAN. Then, if I gather your idea correctly, the Colombian Government, because it is a stockholder in the Panama Canal Company, has given up her sovereign powers and has no other powers than those of any other stockholder?

M. LAMPRE. Its powers as a stockholder and the power derived from the concession.

The CHAIRMAN. And she is subject to the courts of France, to be disposed of as to her interests in this stock as if she were a citizen of France?

M. LAMPRE. I must insist on this point. We are not subject to the courts of France; and, moreover, the only authority that we have to apply to is the stockholders' meeting. The Colombian Government being a stockholder and having a representative at the stockholders' meeting, has passed upon the resolution giving power to the company to negotiate a sale to the United States.

The CHAIRMAN. Now, you state that as being the action of the Colombian Government?

M. LAMPRE. I do.

The CHAIRMAN. Has that ever been communicated to the French Government?

M. LAMPRE. The French Government has nothing to do with it, sir.

The CHAIRMAN. That is a matter of opinion which I will determine for myself. Has it ever been communicated to the Government of the United States?

M. LAMPRE. I do not know about that. No; I think not.

The CHAIRMAN. So, whether Colombia is interested as a sovereign or as a stockholder in this transaction, the interest of Colombia and her dealings with it have not been communicated to the Government of France?

M. LAMPRE. Not to my knowledge; because in this business the Colombian Government is only a stockholder and, of course, is entitled to the rights put forth in the concession and in the by-laws.

The CHAIRMAN. What is this arbitration that you propose to have? What is it to cover?

M. LAMPRE. The division of the amount we may get—only that.

The CHAIRMAN. Whatever that may be?

M. LAMPRE. Whatever it may be.

The CHAIRMAN. Did you say that the court has passed an order?

M. LAMPRE. Yes; the court has given authority to the liquidator, a special authority, besides the general powers that the liquidator derives from the law and from the judgment by which he has been appointed. It has given him special authority to resort to an arbitration court upon the division of the property.

The CHAIRMAN. Has there been a judicial proceeding in that court?

M. LAMPRE. Yes.

The CHAIRMAN. When was it had?

M. LAMPRE. August 2, 1901; last August; six months ago.

The CHAIRMAN. Was it based on the proposition to sell for \$40,000,000?

M. LAMPRE. No price was mentioned. It was based on the contemplated sale to the United States. The offer had not been made at the time.

The CHAIRMAN. The liquidator might arbitrate under the laws of France as to—

M. LAMPRE. As to the offer.

The CHAIRMAN. Let me put my question, please. The liquidator might arbitrate under the laws of France as to any amount of money that might be received under any trade or transaction with the United States out of the sale of this canal?

M. LAMPRE. That is the very thing.

The CHAIRMAN. That is the general order of the court?

M. LAMPRE. It is the special order.

The CHAIRMAN. Your proposition to sell for \$40,000,000 has not, I understand, been acted on by any court?

M. LAMPRE. No; it has been acted on by the stockholders' meeting and agreed upon, under a special decree of the court, by the liquidator.

The CHAIRMAN. So the liquidator, as you describe it and as I understand it, has general authority to arbitrate with the new company as to any amount of money that may be received from the United States on a sale of the property at any time?

M. LAMPRE. Exactly so.

The CHAIRMAN. And that was done when?

M. LAMPRE. The decree of the court giving special authority and general authority is dated August 2, 1901, and the agreement between the liquidator and our company under such authority is dated December 24 of last year, 1901, after authority having been given us by the stockholders' meeting to enter upon negotiations with the United States under the condition of the report of the Isthmian Canal Commission.

The CHAIRMAN. Who were the parties to that last agreement?

M. LAMPRE. The liquidator and our company.

The CHAIRMAN. What is the name of the liquidator?

M. LAMPRE. Monsieur Gautron.

The CHAIRMAN. Have you with you a copy of that agreement?

M. LAMPRE. I have it not with me, but I expect it to reach this country very soon. I guess it will come with the letter to Admiral Walker.

The CHAIRMAN. Now, if I understand these terms, it is that the liquidator will enter into an arbitration under the laws of France for the purpose of ascertaining the amount of money that is due out of the \$40,000,000, if received, to the stockholders whom he represents?

M. LAMPRE. Yes, the liquidation.

Senator MITCHELL. What tribunal, if any, is designated in the agreement as arbitrator?

The CHAIRMAN. Has this last agreement been assented to by any tribunal?

M. LAMPRE. The court has given authority to the liquidator.

The CHAIRMAN. No. Has this particular last agreement been assented to by any court?

M. LAMPRE. It has been assented to. Before it was made it was assented to.

The CHAIRMAN. It could not have been assented to before it was made.

M. LAMPRE. Yes, sir.

The CHAIRMAN. That is an impossibility.

M. LAMPRE. The terms of that decree are——

The CHAIRMAN. Since it has been signed?

M. LAMPRE. No; because there was no occasion for that, as the liquidator has received full authority.

Senator MITCHELL. I understood you to say that the court had authorized this agreement?

M. LAMPRE. It has.

The CHAIRMAN. That is your interpretation of it, but ——

M. LAMPRE. It is a fact. I beg your pardon; it is quite a fact.

The CHAIRMAN. The authorization is based upon an entirely different set of facts.

M. LAMPRE. The court has given authority to the liquidator to enter into that particular agreement, and the liquidator has entered into this agreement.

The CHAIRMAN. To divide the \$40,000,000?

M. LAMPRE. To resort to an arbitration court as to the division of the amount, whatever it might be, that we might get from the United States.

The CHAIRMAN. And whenever it might be obtained?

M. LAMPRE. Whenever it might be obtained. There is no limitation.

The CHAIRMAN. The object of the Panama Canal Company, the new company, according to its by-laws, and according to its charter, according to all of its professions here, was to build and complete that canal?

M. LAMPRE. It was.

The CHAIRMAN. Is that the present object?

M. LAMPRE. It is still the object; but, at the present time, the object is the sale or transfer to the United States. That is what we

contemplate at the present time, but, this failing, of course the object of the company stands.

The CHAIRMAN. You know the internal workings of this company. When they set forth to form the new organization to build a lock canal instead of the old sea-level canal, was it or was it not the purpose of the company really to build a canal, or was it to make a show in regard to the property by which and through which they could sell it to somebody else?

M. LAMPRE. No, sir; the honest, clear, straightforward, and clean purpose was to build the canal.

The CHAIRMAN. This agreement, then, between the liquidator and the new company, and this judgment of the court transferring the property to them, was for that purpose, was it not?

M. LAMPRE. Yes; for that purpose.

The CHAIRMAN. Was there any purpose at that time, either expressed or implied or understood, that this new company was formed for the purpose of getting hold of that property to sell it to somebody else?

M. LAMPRE. No; the object of the company at that time was to complete the canal; but I must state that in the charters, or by-laws, as I would say, for private corporations it is always contemplated that at any time the corporation may sell out to anybody.

The CHAIRMAN. That is your judgment about it. I want to get at facts—just the square, naked facts.

M. LAMPRE. Will you please repeat the question?

The CHAIRMAN. We form our own judgment about what the facts amount to, and we try to do it properly and correctly. We have a right to our judgment upon the the facts, not to accept yours absolutely.

M. LAMPRE. Oh, yes, I do not presume it.

The CHAIRMAN. Now, I want to know if it was the purpose of your company as you have stated it here.

M. LAMPRE. The purpose was to build the canal.

The CHAIRMAN. Have not these stockholders the right to say to the liquidator, "We have not put this property in your hands, and the court has not put it in your hands, for the purpose of traffic, but it has been put in your hands for the purpose of completing a great establishment, out of which we are to draw interest at 5 per cent upon these stocks from the date of their issue?"

M. LAMPRE. I understand the question thoroughly. But you see the liquidator is a party to the agreement which has been inserted in the by-laws. Moreover, the liquidator is a shareholder of the new company. Under these conditions, the liquidator acts upon the resolution passed by the stockholders' meeting. Moreover, there is no authority whatever which could prevent the stockholders' meeting to decide about what it can do. It is left exclusively and solely to the stockholders' meeting of the new company.

The CHAIRMAN. You will allow me to observe that on this side of the Atlantic universally the powers of a corporation are those that are expressed or necessarily implied in the law granting the privilege.

M. LAMPRE. Yes.

The CHAIRMAN. Now, if the powers are not found there, expressed or necessarily implied, they do not exist.

M. LAMPRE. I understand the thing, but you will find an express power.

The CHAIRMAN. I understand you to go upon the idea (if I am incorrect about it you can correct me) that under the power of this charter and by-laws your corporation has a right to do anything with this property that it is not prohibited from doing.

M. LAMPRE. That is it.

The CHAIRMAN. That is your view?

M. LAMPRE. That is the very thing. That is the law under which we act.

The CHAIRMAN. That is so strange to us that we shall be obliged to take some time to consider it before we come to that conclusion.

M. LAMPRE. It is quite a different thing, I understand, in the United States.

Senator MITCHELL. You understand that there was this difference in the law heretofore?

M. LAMPRE. Yes; I understand it.

The CHAIRMAN. So you claim now that you and your company have the right to sell this property to the United States because you are not prohibited from doing it?

M. LAMPRE. Exactly.

The CHAIRMAN. Under that charter?

M. LAMPRE. Exactly; and we have the right to do it (that is what we claim) without even the assent or interference of the liquidator of the old company; but, to make things quite clear, we have got this agreement with him.

The CHAIRMAN. Now, then, that brings up some other considerations.

Senator KITTREDGE. What is the name of the court that rendered the judgment and authorized the agreement you have mentioned?

M. LAMPRE. It is called the Tribunal Civil de la Seine. It is the civil tribunal of the Seine department. That is in Paris, of course.

Senator KITTREDGE. What is the name of the court to which an appeal might be taken from such a judgment?

M. LAMPRE. The court of appeals.

Senator KITTREDGE. Where will we find the law conferring jurisdiction upon those courts to act as they have acted in this matter?

M. LAMPRE. You will find it in the general expressions of the law of July 24, 1867.

Senator KITTREDGE. In what code?

M. LAMPRE. The Commercial Code. It is the duty of the court, whatever court it is, to act upon any question that concerns liquidation and a particular corporation.

Senator TURNER. What principle of law authorized that court to render a decree cutting the stockholders of the old company out of the benefits of your contract with this liquidator for their benefit?

M. LAMPRE. I do not get the question quite well, Senator.

Senator TURNER. You contracted as a part of your charter, I understand you to say, that you would build this canal and operate it and pay the liquidator for the benefit of the old company 60 per cent?

Mr. LAMPRE. Yes.

Senator TURNER. Now, if you sell out to the United States, of course you can not carry out that obligation to the old company or to the stockholders of the old company.

M. LAMPRE. No. I understand.

Senator TURNER. And there will be nothing to go to them. This contract with the liquidator relieves you of the obligation for the benefit of the stockholders of the old company?

Mr. LAMPRE. Yes; but we shall have to let them share in the amount we may obtain.

Senator TURNER. Now, I want to know what principle of law of France would authorize the liquidator to make a contract which would cut the old stockholders out from the benefits of the provisions of that contract.

M. LAMPRE. The general principle under which receiverships are organized.

Senator TURNER. Your company is not in the hands of a receiver, is it?

M. LAMPRE. No.

Senator TURNER. It is still operating?

M. LAMPRE. Still operating.

Senator TURNER. It is still obligated to carry out this contract made for the benefit of its stockholders?

M. LAMPRE. Exactly.

Senator TURNER. What right has this liquidator to relieve it of its obligation to the old stockholders?

M. LAMPRE. I would like to make it clear that the stockholders' meeting of corporations in France is the only authority to decide this business. The court has nothing to do, I wish it to be understood, if possible, with what we, the standing corporation, do. That is the business of the stockholders' meeting.

Senator TURNER. The stockholders of this new company have no right to relieve the new company of this obligation to the stockholders of the old company? They can not by a mere vote relieve themselves from the obligation of their contract?

M. LAMPRE. I do not see that. They can, indeed.

Senator TURNER. You predicate their right upon the action of your stockholders, the stockholders of the new company?

M. LAMPRE. Yes.

Senator TURNER. To contract with the liquidator for the benefit of the stockholders of the old company?

M. LAMPRE. Yes.

Senator TURNER. Now, the action of the stockholders of the new company can not relieve that company from that obligation?

M. LAMPRE. I understand the question itself, but you see I stated in the course of this hearing that we are guided solely and only by our charter, and the charter does not forbid in any way that we should make a transfer or sale of our rights to anybody whatever.

Senator TURNER. But I understood you to say that your charter did contain this contract with the liquidator?

M. LAMPRE. It does contain it.

Senator TURNER. Under which you were to construct this canal and operate it?

M. LAMPRE. The liquidator has authority to relieve us from that contract, and he has agreed to what has been just passed upon.

Senator TURNER. What I ask you is what principle of law authorizes this liquidator to relieve you of the obligation for the benefit of the old stockholders without securing anything to them?

M. LAMPRE. That is the business of the court to decide, and the court has decided it.

The CHAIRMAN. I think you had better make that clear, because I do not believe the Congress of the United States will want to join your

company in inflicting an act of absolute injustice upon these old stockholders.

M. LAMPRE. I am quite willing to make it clear, as much as I can.

Senator HANNA. At the meeting did the old stockholders take any part in this agreement?

M. LAMPRE. The liquidator was present.

Senator HANNA. By what authority?

M. LAMPRE. By authority of the judge appointing him and by authority of the law itself, as well as for the reason that he is a large shareholder of the new company.

Senator FOSTER, of Louisiana. What I am trying to reach are the real true facts of this transaction and what obligations this Government would assume in the event that it should accept your proposition?

M. LAMPRE. Nothing but to pay the price agreed upon, sir.

Senator FOSTER, of Louisiana. Your purchase of the rights and property of the old canal imposed upon you certain obligations. One of the obligations was to dig the canal, and the other was to pay 60 per cent of the benefits of the canal to the old company?

M. LAMPRE. Exactly so.

Senator FOSTER, of Louisiana. Now, you propose to transfer all of your right, title, and interest to this Government?

M. LAMPRE. Yes.

Senator FOSTER, of Louisiana. The general principal of law, as I understand it, is that this Government would then step into your position and assume your obligations. That, I believe, will be accepted as a general proposition of law.

M. LAMPRE. Yes; but—

Senator FOSTER, of Louisiana. Now, how will your company relieve us of the obligation which you have assumed to the old stockholders? I understand that you say this will be done by an arbitration between your company and the liquidator, which arbitration will be finally acted upon and homologated by the court?

M. LAMPRE. I do not say that, sir. I beg your pardon. I say that at the present time we have full authority on the one part from our stockholders' meeting and on the other part from the liquidator, who is the representative of these interests we are speaking of in the old company, to deal directly, without any interference, with the United States Government and to sell our rights and property at any amount whatever. Moreover, the liquidator has agreed that the amount to be obtained from that sale would be divided according to the decision of an arbitration court which has been agreed upon. The names of the men have been agreed upon, and this is to be the only authority to decide as to what proportion is to be given to the liquidator and to our company.

The question of division, I must insist upon, has to my mind nothing to do with our dealings with the United States, and this agreement, covering the two, gives full power to the company to act as to the dealings with the United States. Second, the division of the amount to be obtained has been agreed upon by the court at the date of August 2, 1901, under a decree rendered by a court giving full authority to the liquidator to pass such an agreement.

Senator TURNER. Does that decree undertake to cut off the stockholders from pursuing you successor, as they would have a right to pursue you, to compel the performance of the contract by which you got title to the canal?

M. LAMPRE. I do not think that I understand the question. You mean about the 60 per cent?

Senator TURNER. No. Does that decree which you say authorizes you to make this sale cut off—

M. LAMPRE. The rights of the liquidator?

Senator TURNER. The rights of the stockholders of the old company to insist that your company shall carry out the obligation which you undertook to carry out toward them? Does it specifically cut them off?

M. LAMPRE. It does not say so.

Senator TURNER. Then it is a question of judgment as to whether they would have a right not to be cut off if they should insist on it?

M. LAMPRE. You see, sir, our obligations were to give the liquidator 60 per cent out of the profits. We have no profits.

Senator TURNER. Your obligations were to construct the canal and give 60 per cent?

M. LAMPRE. Sixty per cent out of the profits when the canal would be completed; but in the present condition of affairs there is no profit to divide. There will be a fixed amount, whatever it may be, to be divided between the old company and ourselves; and that will be divided according to the decision of that arbitration court under the authority of the agreement passed between the liquidator of the old company and ourselves—an agreement passed under the authority of the court.

Senator FOSTER, of Louisiana. Suppose a majority of the stockholders and a majority of the creditors should come into court and oppose the ratification or homologation by the court of the action of the liquidator in this matter?

M. LAMPRE. In my opinion the court would do away very soon with such a claim, having given the authority.

Senator FOSTER, of Louisiana. The liquidator represents the—

M. LAMPRE. He represents the whole of the interest.

Senator FOSTER, of Louisiana. Suppose the majority of the stockholders and the majority of the bondholders should come into court and say, "We think the liquidator has made a very bad bargain for us, and we oppose homologating the action of the liquidator," what would be the probable action of a judge in a case of that kind?

M. LAMPRE. In my opinion there would be no doubt as to the action of the court. It would confirm purely and simply the decree authorizing the liquidator to pass that agreement with us and to settle the whole business.

The CHAIRMAN. Without reference to its justice?

Senator FOSTER, of Louisiana. Without reference to the justice, the fairness of it?

M. LAMPRE. Of course, the court thought it fair when it gave the authority to the liquidator.

Senator KITTREDGE. Were those stockholders and creditors given an opportunity to be heard at the time the court authorized the making of this agreement?

M. LAMPRE. No, sir; because the liquidator is the representative, and he has the power to act.

Senator KITTREDGE. Then the liquidator had notice of the application for authority to make this agreement?

M. LAMPRE. He himself applied for that authority. He was the

man who applied for the authority in the capacity of liquidator of the old company, representing the interests involved in that company.

Senator MITCHELL. You stated a moment ago that the names of the arbitrators had already been selected. I should like to know how many there are and who they are.

M. LAMPRE. There are four of them, who are to appoint a fifth as president. The names are the highest legal authorities in the court. One of them—there are two for the company—is M. DuBuit.

Senator MITCHELL. Is it stipulated in the agreement between the liquidator and the new company that the decision of this board shall be final?

M. LAMPRE. It is, and it is legal. It is the law in France of arbitration.

Senator MITCHELL. Does it require a majority or the whole of the board to determine?

M. LAMPRE. Oh, no; a majority.

Senator MITCHELL. There would not be under your law a review of the decision they might make?

M. LAMPRE. No; because any parties resorting to arbitration in France are at liberty to state that they agree that the decision of the arbitration court is final, and without any appeal whatever, and so has it been done.

Answering to the question just put me, the names of the gentlemen are the highest legal authorities in France, and three of them have been presidents of the bar association in the court of appeals of Paris. These are the names: M. DuBuit and M. Léon Devin, arbitrators for the company; M. Limbourg and M. Thieblin, arbitrators for the liquidation of the old company; and the fifth is to be M. Betolaud.

The CHAIRMAN. I will now resume the examination, if the other members of the subcommittee are ready.

Senator FOSTER, of Louisiana. Mr. Chairman, there is one question on this same line that I should like to ask.

The CHAIRMAN. Certainly.

Senator FOSTER, of Louisiana. If I understand the law correctly, it is about this, that where parties agree to enter into an arbitration, that arbitration as between them is final.

M. LAMPRE. It is.

Senator FOSTER, of Louisiana. But in order to have binding force it must be submitted to the court.

M. LAMPRE. No, sir, no; it is final between the parties.

Senator FOSTER, of Louisiana. Where a liquidator is appointed?

M. LAMPRE. He has the authority to enter into that contract. He has it now. It has been given to him before he passed the agreement. He was entitled under a decree of the court to enter into an agreement to that effect.

Senator FOSTER, of Louisiana. Have the arbitrators acted on this matter?

M. LAMPRE. Not yet; they can not act before we know what we may get.

The CHAIRMAN. The case has not been presented to them yet?

M. LAMPRE. Not yet, to my knowledge.

The CHAIRMAN. You have been speaking of the stockholders' meeting. I will take the last one. Who represented the stockholders of the old company at the last meeting?

M. LAMPRE. The liquidator, Mr. Gautron.

The CHAIRMAN. Is he recognized as being authorized to represent it?

M. LAMPRE. Oh, yes; it is in his powers. Moreover he is a stockholder himself.

The CHAIRMAN. So the stockholders in the old company are stockholders in the new?

M. LAMPRE. Oh, no, sir; not at all.

The CHAIRMAN. How could they be there represented, unless they were stockholders?

M. LAMPRE. I do not get the question quite.

The CHAIRMAN. How could they be represented in the stockholders' meetings unless they were stockholders of the company?

M. LAMPRE. Oh, quite so. Mr. Gautron, as the liquidator of the old company, has subscribed in the stock of this company for the liquidation an amount, I believe, of 16,000,000 francs out of the 60,000,000 francs, and of course he appears at the stockholders' meeting not only as the representative of the old company but as shareholder in the new one.

The CHAIRMAN. Very good. He is a shareholder, then, for the benefit of the old stockholders?

M. LAMPRE. Yes.

The CHAIRMAN. So that they have in equity, to say the least of it, all of the rights of stockholders to be represented by their man, their liquidator?

M. LAMPRE. Yes; and they are represented by him.

The CHAIRMAN. Did they select the liquidator or did the court appoint him?

M. LAMPRE. The court appointed him.

The CHAIRMAN. The old stockholders had nothing to do with selecting him?

M. LAMPRE. No; nothing.

The CHAIRMAN. It was just taken into court and the court appointed a liquidator?

M. LAMPRE. Exactly.

The CHAIRMAN. And from that time forward he represents them and subscribes all their stock, no matter how much it amounts to?

M. LAMPRE. With the approval of the court.

The CHAIRMAN. I know; but he subscribes 16,000,000 francs out of the 60,000,000 francs, because he represents what on this side of the Atlantic we would call stockholders. On the other side I do not know what they are called.

M. LAMPRE. He is a stockholder because the liquidation is a stockholder.

The CHAIRMAN. Of course, as trustee for the stockholder.

M. LAMPRE. Oh no; we have no such thing. It is quite different.

The CHAIRMAN. The stock does not belong to the liquidator?

M. LAMPRE. No; it belongs to the interests he represents, the liquidation.

The CHAIRMAN. Of course. I think we understand that. He is there merely as their agent to represent them?

M. LAMPRE. Quite so, sir.

The CHAIRMAN. At the same time he is the agent of the law?

M. LAMPRE. Quite so.

The CHAIRMAN. Authorized to do it?

M. LAMPRE. Quite so.

Senator TURNER. How much money has the new company put into this enterprise?

M. LAMPRE. At the present time?

Senator TURNER. Yes.

M. LAMPRE. I think I stated at the beginning of this hearing that as far as I can recollect at the present time about 16,000,000 francs are left from 60,000,000 francs originally subscribed.

The CHAIRMAN. I expect to examine M. Lampre on that point. Do you mean the stock?

Senator TURNER. How much money has the company actually expended in the enterprise?

M. LAMPRE. The difference between 60,000,000 francs and the 16,000,000 francs; that is to say, assuming my figures to be correct, we would have expended 44,000,000 francs.

Senator TURNER. That is eight or nine million dollars. If the new company are to get 40 per cent of the \$40,000,000 they would be making considerable money.

M. LAMPRE. I do not know what the percentage will be.

Senator TURNER. That is a matter for the arbitrators?

M. LAMPRE. That is so.

The CHAIRMAN. The Government of Colombia, as you stated, was one of the old stockholders?

M. LAMPRE. The Government of Colombia is a stockholder now.

The CHAIRMAN. Is she represented also by the liquidator?

M. LAMPRE. No; represented by a representative of the Colombian Government in the stockholders' meeting, appointed every time.

The CHAIRMAN. A director?

M. LAMPRE. Not a director; a diplomatic representative of Colombia.

The CHAIRMAN. Does he enter into the directors' meetings?

M. LAMPRE. There is one. There is a permanent representative of the Colombian Government at the meetings of the board, and he knew everything about what happened.

The CHAIRMAN. Does that representative enter into the stockholders' meeting?

M. LAMPRE. Yes; he does. He is present.

The CHAIRMAN. Is he living in France?

M. LAMPRE. He lives in Paris.

The CHAIRMAN. He is an agent appointed by the Colombian Government to represent them there, I suppose?

M. LAMPRE. Yes; and, moreover, at every stockholders' meeting the Colombian Government gives authority to this or to another representative to vote, to be present at the meeting, and to pass upon the resolutions.

The CHAIRMAN. Then, the Colombian Government being stockholder in the old company that we know has interests which are entirely separate and different from the balance of the stockholders of the old company—

M. LAMPRE. The Colombian Government is not a stockholder in the old company, but in the new.

The CHAIRMAN. You say the Colombian Government is not represented by the liquidator.

M. LAMPRE. No; not being a shareholder in the old company.

The CHAIRMAN. And the Colombian Government has this agent that you speak of to act with or be present at the meetings of the board of directors and managers?

M. LAMPRE. Yes.

The CHAIRMAN. Has that agent a voice in the management?

M. LAMPRE. No.

The CHAIRMAN. No voice?

M. LAMPRE. No voice.

The CHAIRMAN. Like one of our Delegates here from a Territory, he can come and take a seat, but can not vote?

M. LAMPRE. I beg pardon; he has, according to the commission, all the rights belonging to the directors themselves.

The CHAIRMAN. Does he participate in the direction of the company?

M. LAMPRE. No; he does not participate in the direction of the company, but he is present at all the meetings if he chooses.

The CHAIRMAN. Does he vote?

M. LAMPRE. He votes if he chooses to vote.

The CHAIRMAN. As a director?

M. LAMPRE. As a director.

The CHAIRMAN. Now, have you any authority besides that which this man represents in the canal, that you have just stated, from the Government of Colombia by which that Government is bound to this proposition to sell for \$40,000,000 and divide the proceeds by an arbitration?

M. LAMPRE. We have the authority of the Colombian minister here to enter upon negotiations with the United States.

The CHAIRMAN. You have?

M. LAMPRE. We have. That was given in May last.

The CHAIRMAN. Have you a copy of that authority?

M. LAMPRE. No, sir; but certainly it can be had.

The CHAIRMAN. Was it an authority to make a specific contract or was it a general authority to enter into any arrangement you pleased?

M. LAMPRE. A general authority.

The CHAIRMAN. The forty-million-dollar proposition has not been submitted to the Colombian Government?

M. LAMPRE. Not formally. I advised the Colombian minister here, but to my knowledge, unless it has been done from Paris, it is the only thing at the present time.

The CHAIRMAN. That is a matter between private gentlemen. That is not a governmental affair.

M. LAMPRE. No.

The CHAIRMAN. Now, I observe that your concession from the Colombian Government, and all the right it has ever granted, and all the amendments that have been granted to it have been by act of Congress of Colombia?

M. LAMPRE. Yes, sir.

The CHAIRMAN. The paper, the contract itself, was signed by the authorities of the Colombian Government?

M. LAMPRE. Yes, sir.

The CHAIRMAN. And then that contract was embodied in and made a public statute of Colombia?

M. LAMPRE. Yes, sir.

The CHAIRMAN. By an act of Congress?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Has the Colombian Congress given you any authority to proceed to make this arrangement with us now?

M. LAMPRE. None at all; we could not ask them for it.

The CHAIRMAN. What authority could you possibly have from the Colombian Government, unless it came from an act of Congress, when the act of Congress forbade you to do it?

M. LAMPRE. It is the authority given us by the Colombian minister under his Government's authority.

The CHAIRMAN. That is all the authority you have?

M. LAMPRE. That is all we have at the present time.

The CHAIRMAN. Have you a copy of that?

M. LAMPRE. I guess we have. It is printed in the report of the Commission.

The CHAIRMAN. That is all the governmental authority that you have from Colombia?

M. LAMPRE. At the present time.

The CHAIRMAN. That is as deep into the subject as Colombia has ever gone?

M. LAMPRE. Exactly; to my knowledge.

The CHAIRMAN. You have been before this Government from time to time with various propositions. I have here a message from the President of the United States, which informs us of all of the communications that you have made up to this last one on the subject of this canal, sent to Congress by a message of the President, President McKinley, on the 20th day of February, 1900.

M. LAMPRE. Yes, sir.

The CHAIRMAN. You are aware of the contents of that first proposition, signed by M. Bonnardel and countersigned by you?

M. LAMPRE. I should like to hear the words again, if you please, or to peruse them.

The CHAIRMAN. It is quite an extensive document.

M. LAMPRE. As far as I recollect, it was a proposal as to a partnership with the United States Government. Is not that the case?

The CHAIRMAN. No; you had not advanced to a partnership then. It is as follows:

“PARIS, *November 18, 1898.*

“To the PRESIDENT OF THE UNITED STATES.

“SIR: The New Panama Canal Company believes it to be its duty to respectfully submit the following statement:

“It is common knowledge that in 1889 the *Campagnie Universelle du Canal Interoceanique de Panama*, the old company, fell into financial difficulties after about one-third of the canal had been finished. The rights of that company then passed judicial administration. A liquidator (receiver) was appointed by the judgment of the civil tribunal of the Seine under date of the 4th of February, 1889. During his administration (1889–1894) and with the authorization of the court, the greatest care was taken to preserve and maintain the work already done.”

I wish to call your attention to that.

“And a prolongation was obtained from the Republic of Colombia of the time stipulated for the completion of the canal, thus preserving the rights of the company under its concession in their entirety.

“In view of the advanced state of the work on the canal, and the

considerable sum (at least \$150,000,000) actually expended for canal work properly so called, and for installations and plant, the logical conclusion followed that the very large capital invested would be protected through a reorganization of the affairs which took place successfully in the month of October, 1894. At that time and with this object in view the undersigned company was organized under the general laws of France. The company is a commercial association, formed exclusively upon private capital, and has no connection, alliance, or relation whatever with any government, except the relations established by the concessions which it holds from the Republic of Colombia. The board of directors of the company is an entirely new board, and composed of gentlemen of independent positions, having no official relation with the old Panama Company, and for the most part identified with large financial and commercial enterprises.

“Pursuant to judicial sale, authorized by the court as aforesaid, the undersigned company in 1894 became the sole owner of all the canal works, plant, material, concessions, and other property of the old company. The title of the undersigned to this property is therefore unquestionable, and has been officially recognized by the Government of Colombia.

“Surveys had been made by the old company, but the new company, while making use of them, would not be bound by their conclusions. The board of directors resolved at the start to examine and study anew all the questions involved, making use of the most recent improvements in material and of the advances made in engineering.

“It is needless for us to enumerate the difficulties and enormous expense involved in the choice of a definite plan for the execution of this work, which is one of the greatest undertakings of our time.

“Different plans, equally practicable but varying in probable cost, have been studied. Many months have been spent in preparing, studying, and revising them. This work has not been done hastily and superficially. Engineers, chosen specially for their professional ability, have studied the question in all its details—technical, climatic, physical, geologic, and economic.

“Though the skill of its own technical staff is worthy of the highest confidence, the undersigned company, out of abundant caution and in order to place beyond criticism the final conclusions, caused to be appointed an international technical commission, composed of engineers selected from different nationalities, a course which assures to the company the benefit of the widest possible experience, the severest judgment, and the most independent conclusions. The international technical commission is composed as follows”—

Giving the names of these gentlemen, among whom is General Abbot, United States Engineer Corps, the only American, except Mr. Sosa, who died.

M. LAMPRE. I beg pardon; I believe there was another American, Mr. Fteley, of New York.

The CHAIRMAN. Yes; I beg pardon. After the names the communication proceeds:

“As to all statistical and economic questions, the new company established a special commission, presided over by M. Paul Leroy-Beaulieu, the eminent economist and a member of the Institute of France.

It is certain that the members of these two commissions are the

most distinguished and able men in their professions. No one of them would compromise his reputation and his honor, acquired by a long life of eminent services, by formulating conclusions upon unfounded, incomplete, superficial, or uncertain information.

"By the closest study of the subject; by actual inspection of the works of the canal, made by several of its members; by full discussion, and by frequent exchange of views; by subjecting every problem to the critical judgment of all, thus obtaining the most varied opinions; by all the methods and with all the care which the most advanced technical experience could suggest, this eminent commission of engineers has reached a unanimous conclusion, which has been officially communicated to this company, and upon which this company is pursuing the work of construction. These conclusions, signed by every member of the commission, establish the entire feasibility and practicability of completing the canal.

"We do not doubt that you will be interested to learn the essential features of our plans, which have been prepared with so much labor and care and confirmed by four years of continuous study.

"1. The old company had already substituted for the proposed sea-level canal a system of locks."

I call your attention to the fact that you have abandoned the old sea-level canal.

"This principle, with important modifications and improvements, has been adopted by the new company.

"2. The length of the canal from ocean to ocean is 46 miles.

"3. The locks will not exceed four on each slope of the divide; all locks will have a rock foundation, and all will have double lock chambers.

"4. There is nothing in the physical conditions on the Isthmus to prevent a change from a canal with a system of locks to a sea-level canal should the latter seem desirable in the future.

"5. The time of passage from ocean to ocean will be less than a day.

"6. The harbors situated at either extremity (Panama and Colon) are not artificial harbors; they are natural harbors, safe and satisfactory, needing but slight improvement. This fact is known to all the world, thanks to commerce, which for almost fifty years has made use of the Panama route (the Panama Railroad).

"7. Two-fifths of the work on the canal has been actually constructed; the remaining three-fifths is in a fair way of completion. During the last four years three or four thousand workmen, on an average, have been employed in working on the canal.

"8. The company's concessions are unquestionable. The Republic of Colombia has given to the enterprise its cordial and sincere cooperation.

"9. The existence and operation of the railroad, long established on the proposed line of the canal, greatly facilitates its construction.

"10. No construction is planned which is not fully justified by practical experience."

"Formerly the greatest difficulties were:

"(a) The control of the floods of the Chagres River; and

"(b) The excavation of the Culebra Cut.

"The manner in which each of these difficulties is to be surmounted is shown with the greatest detail in the report of the technical commission, which we have the honor to present to you.

"The condition of the new company is equally satisfactory. Its assets, including the work actually done on the canal, the buildings, the machinery, the material on hand, exceeds in value 500,000,000 francs, or \$100,000,000, which valuation has been made by a special commission, of which the former director of the National Academy of Roads and Bridges of France was chairman. The company has no mortgage or bonded indebtedness."

I suppose that means the new company?

M. LAMPRE. That is true; yes.

The CHAIRMAN (reading):

"The property is free from all incumbrance. The company has no other debts than monthly pay rolls. Its cash reserve is largely in excess of its actual needs.

"The undersigned company also invites your attention to the provisions of its concession, particularly articles 5 and 6, which reserves all rights to the Government of the United States secured by the treaty with the Republic of Colombia signed in 1846 and ratified in 1848.

"We have the honor to be, your obedient servants,

"J. BONNARDEL,

"The President of the Board of Directors.

"Certified by the secretary of the company.

"ED. LAMPRE."

It seems to be countersigned by you. Then, Mr. Cromwell, who was the attorney, or so signs himself——

M. LAMPRE. He was the attorney.

The CHAIRMAN. Mr. Cromwell, counsel for the company, writes to Mr. Hay on the 28th day of November, 1898, and refers to an interview which Mr. Hay had accorded him last Friday, and says:

"By reason of the severe prevailing storm *La Touraine* was delayed in arrival until today, and we shall therefore not be able to translate the documents and prepare them for presentation before Wednesday."

That, of course, referred to the engineer's report?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Then Mr Cromwell telegraphs to Mr. Hay, on the 5th day of December, 1898, as follows:

"Am writing you to-day concerning the cable from Consul-General Hart published Saturday. It is evident that the limited purpose and nature of the measure referred to is not fully reported from Bogota, and is given undue significance."

That was a disturbance, of course, in the Government down there; such a one as is going on there now.

There are several other communications which I will have copied for insertion at this point. It is unnecessary that they should be referred to now particularly.

The letters referred to are as follows:

"NEW YORK, *December 5, 1898.*

"MY DEAR SIR: I beg leave to confirm the telegram which I sent you at 10.45 this morning, as per inclosure.

"Upon my return I learned through Director-General Hutin (who had preceded me to New York) that the measure which had just been acted on by one branch only of the Colombian Congress was a bill to authorize the Executive to negotiate the terms of and to conclude a

further prorogation of six years from 1904 for the completion of the canal under a communication which the company had addressed to the Government, in the form of which I inclose you a translation.

"You will note that the company specifically stated to the Government that the prorogation was not a matter of absolute necessity, but was desirable in the interests of commerce and navigation to enable an even deeper cut to be made (and which would reduce the number of locks to four), but which reduction would of course require more time than the plan adopted.

"You will note that the bill proposed to confer power upon the Executive, and this happened to arise under extraordinary political conditions in Bogotá. As you have probably been advised through official channels, a serious difference has recently been existing between the House of Representatives of Colombia and the President, the House having passed formal resolution declaring the office of President vacant, and refusing to recognize the qualifications of the President before the supreme court.

"We therefore construe the action of the House of Representatives as only a part of the strife between the House and the President, and not a declaration of the policy of the nation or the Congress in respect of the Panama Canal, and as not evidencing hostility to the company itself. We are the more confirmed in this belief because of the uniform consideration and cordiality displayed by the Congress and the Government to the New Panama Canal Company, which we have no doubt their minister at Washington would fully confirm to you.

"Our company has not the least apprehension regarding any prorogation of its concessions it may consider necessary in the future.

"I have, etc., your obedient servant,

"WM. NELSON CROMWELL,

"*Counsel New Panama Canal Company.*"

[Inclosure in letter of Mr. Cromwell to Mr. Hay, December 5, 1898.]

"To the Seigneurie, Dr. P. A. MOLINA,

"*Minister of Finance of the Republic of Colombia, Bogota:*

"Alexander Napoleon Mancini, representative to the Government of Colombia of the New Panama Canal Company, has the honor to reply to your excellency and to explain the following, viz:

"At the time of the prorogation accorded in 1893 there was in view the completion of the canal in accordance with the plan as established by the technical commission, which plan determined the lowest level of the divide to be between 35 and 30 meters below the sea level.

"The studies made by the new company show that it will be of great advantage to make the cut deeper, and such work will naturally require a longer time.

"It is not necessary to call urgent attention to the fact that the Colombian Government itself has the greatest interest to facilitate the completion of the canal affording the best possible conditions for navigation and commerce.

"There is no doubt that the interests of Colombia are closely identified with those of the canal company, and that the future of this nation depends in part upon the success of the works of the canal at Panama; and it is admitted that in order to provide in a very complete manner

the increasing necessities of navigation and commerce it becomes doubly important to deepen the cut of the central mass below 25 meters. The plan of completion of the canal as prepared by the company, with the aid of its technical commission, suggests the idea to the canal management of deepening the cut to about 10 meters. Therefore the time of completion of the canal, which is at the end of 1904, becomes insufficient for the completion of said important work, and the company could not without serious risk of miscalculation affirm that the canal with such modification can be completed within the said time, and the company considers that it is proper to ask a prorogation of six years from 1904, so that it may complete the canal in the condition above mentioned.

"All that precedes is not of absolute necessity. The company can if necessary make the cut at 25 meters, for instance, as heretofore calculated, and in that case a further prorogation will not be absolutely necessary. But on the other hand the company considers, as said above, that the deepening of the cut to about 10 meters will give much better results in respect to the operation of the canal.

"The Colombian Government can not fail to realize the importance of the purpose above explained and of the interest attached to a prorogation. Consequently, and in consideration of the considerable advantages which will inure to general commerce from the opening of the canal, the undersigned solicits, in the name of the New Panama Canal Company, a prorogation of six years for the completion of the canal, and is confident that the Government of the Republic will accord such extension of time under the best possible conditions.

"The company relies upon the kind cooperation of the Colombian Government, which has such great interest in the work, to facilitate the completion of such work.

"The undersigned does not need to recall to your excellency that during the past four years the company has constructed works of such great importance that they have attracted the attention and approbation of all competent people who have visited the Isthmus.

"I have, etc.,

"A. MANCINI,

"Representative of the New Panama Canal Company.

"BOGOTA, November 1, 1898."

"NEW YORK, December 21, 1898."

"MY DEAR SIR: Further to my letter of December 5, 1898, receipt of which was acknowledged by your favor of the 8th instant, I beg leave to say that we are advised by our counsel at Bogota that the official minutes of the session of the House of Representatives declares that the bill concerning the extension of the New Panama Canal Company has not been acted upon for lack of time. We, however, yesterday received further cable advising us that the Government had granted the extension subject to the approval of the next Congress, and I note from this morning's Herald that similar advices have been received by the press.

"It is the opinion of the Government executives and of ourselves that power to give such extension is already located in the Government by the terms of the original concession; but the formality of

ratification will be requested in due course, and of its being granted we have not the remotest apprehension.

"You will thus see that my confidence in the attitude of Colombia, as indicated in my last note, has been fully and quickly confirmed.

"Faithfully, yours,

"WM. NELSON CROMWELL,
"General Counsel New Panama Canal Company."

"NEW YORK, December 21, 1898.

"SIR: In addition to the certified copy of the official report of the International Technical Commission, which I had the honor of delivering to you on the 2d instant as a part of the communication of the company addressed to the President under date of November 18, 1898, I now have the honor of handing you a copy of an additional report made November 19, 1898, by Messrs. Zurcher and Bertrand, eminent engineers of France, upon the cut of the Culebra and the Emperador mountains.

"The report of the International Technical Commission, as well as the inclosure, being part of our official communication to the President, are for your official files and use. I merely mention this that you may not courteously consider them confidential.

"I have the honor, etc.,

"M. HUTIN,
"Director-General of the New Panama Canal Company."

The CHAIRMAN. Now, M. Lampre, that letter to the President of the United States does not contain any proposition?

M. LAMPRE. No, not at that time; no, sir.

The CHAIRMAN. Why was it written?

M. LAMPRE. Because to my recollection it was contemplated at the time that something ought to be done in the way of a reorganization of the company. It appeared at the time that the Nicaragua concession was under discussion that the rivalry of such a canal might be a great danger to the Panama canal, and we thought at the time, as far as I can remember—it is rather old, it is three years ago—we thought at the time that we had to lay the whole subject before the President in order to ascertain and to see under what conditions we might, if necessary, Americanize our corporation and build the canal in partnership with the American interests. That is my recollection.

The CHAIRMAN. With the American Government?

M. LAMPRE. Well, I suppose private or public American interests. I think at the time it was contemplated to have a private corporation.

The CHAIRMAN. You had money enough then at hand or in prospect to build the canal?

M. LAMPRE. We had not in cash money enough.

The CHAIRMAN. You had good credit, though?

M. LAMPRE. Yes, I think we had; but still——

The CHAIRMAN. You were confident then that you could complete the canal?

M. LAMPRE. We were confident, but still, as you know, there was the rivalry of the Nicaragua canal.

The CHAIRMAN. And it was the rivalry of the Nicaragua route that caused this paper to be printed?

M. LAMPRE. Yes, sir; exactly.

The CHAIRMAN. Was it argued at the time the letter was written that the United States was about to take or had taken action in favor of the Nicaragua route?

M. LAMPRE. I forget whether it was at that time.

The CHAIRMAN. We can ascertain that by a reference. Was this letter discussed and the authority given to send it to the President at a meeting of the board of directors of the new Panama Canal Company?

M. LAMPRE. Yes; it is in accordance with the resolution of the board.

The CHAIRMAN. The letter says that the board of directors is composed of gentlemen in an independent position?

M. LAMPRE. Yes, sir.

The CHAIRMAN. They must have been interested in and identified with large affairs in Paris?

M. LAMPRE. So they were, and are still at the present time.

The CHAIRMAN. Of a financial character?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Was it not the fact that the new board was composed of gentlemen who took over the property on speculation?

M. LAMPRE. At the time or now?

The CHAIRMAN. At the time it was consummated.

M. LAMPRE. For speculation? No, sir.

The CHAIRMAN. They took it over with the intention of completing the canal?

M. LAMPRE. Quite so. They were honest and straightforward in the intention. I must be positive on the subject.

The CHAIRMAN. They are still able to do it, are they not?

M. LAMPRE. Oh, yes, sir.

The CHAIRMAN. The French people are still able to do it?

M. LAMPRE. They might.

The CHAIRMAN. They paid the indemnity to Germany without any trouble, and we thought that the most marvelous act ever performed.

M. LAMPRE. I think we have enough cash in France.

The CHAIRMAN. You have plenty there to do it?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Why are you trying to sell this canal enterprise for \$40,000,000 when your people are able to build it and have so much involved in it?

M. LAMPRE. That is quite a different question, in my opinion. We have plenty of cash in France to build it, but the rivalry with the Nicaragua route and the possibility of the Congress of the United States passing a resolution for the construction of the Nicaragua Canal has frightened the people there, and so we thought it best to seek some kind of a combination here to build the canal, then with the assistance of the United States, and now to let the canal go to the United States if they will have it.

The CHAIRMAN. Your first proposition was to build the canal and realize out of it what you expected to do?

M. LAMPRE. Exactly.

The CHAIRMAN. That was your first idea?

M. LAMPRE. Exactly.

The CHAIRMAN. That was the idea on which that letter was written?

M. LAMPRE. Exactly, sir.

The CHAIRMAN. Then, if you could not do that, to prevent the building of it on the Nicaragua route?

M. LAMPRE. We did not intend preventing anything, but we thought the Panama route in our opinion the best.

The CHAIRMAN. Was it not the purpose of this movement to compel the United States to build on your ground or not build at all?

M. LAMPRE. To compel?

The CHAIRMAN. Yes.

M. LAMPRE. We had no mind to compel anybody.

The CHAIRMAN. I do not mean by force of arms.

M. LAMPRE. Our opinion was that the United States Government, or Congress, passing upon a resolution for the construction of the Nicaragua Canal would place us in great difficulty to raise the money in France. So we thought that we might as well lay the whole subject before the United States.

Senator MITCHELL. May I ask a question right there?

The CHAIRMAN. Certainly.

Senator MITCHELL. Suppose the United States should decline the offer which has been made by your company, and suppose, furthermore, Congress should go on and authorize the construction of the Nicaragua Canal, do you think that the Panama Canal would then be completed?

M. LAMPRE. It might be.

Senator MITCHELL. What is your best judgment on that point? What is your opinion?

M. LAMPRE. It might be. We might raise the money still in France.

The CHAIRMAN. Just in that connection I will ask you if you have made efforts to raise money in France to complete the canal?

M. LAMPRE. No; for we have no bondholders and not any bonded indebtedness at all.

The CHAIRMAN. I do not mean that. Have you asked for subscriptions?

M. LAMPRE. No, we have not.

The CHAIRMAN. You have not invited the French people to subscribe at all?

M. LAMPRE. No; we have not, because we thought it best, under the circumstances, not to go before the public, being given the possibility of the construction of the Nicaragua Canal by the United States.

The CHAIRMAN. In this letter to the President it is stated that the assets of the company exceed in value \$100,000,000.

M. LAMPRE. Yes, sir.

The CHAIRMAN. That the property is free from incumbrance; that the title is unquestionable; that the company has no other debts than the monthly pay rolls; that it has no mortgages or bonded indebtedness, and its cash reserve is largely in excess of its actual needs.

M. LAMPRE. Yes, sir.

The CHAIRMAN. So this statement of the great strength and confidence of the Panama Canal Company was sent to the President to inspire him with like confidence in the success of the Panama Canal and to convince him and Congress and our people that it would be a fatal competition to the Nicaragua Canal?

M. LAMPRE. Well, I do not know, sir. I do not know what was at the time in the mind of the board. I can not answer that question. I do not know what they aimed at. I think it was only putting the whole subject before the President in the light in which it stood and showing how it stood.

The CHAIRMAN. Or was it the purpose then to prepare the United States to become the purchasers of the Panama Canal?

M. LAMPRE. At that time?

The CHAIRMAN. At that time.

M. LAMPRE. I do not know at the time what it was.

The CHAIRMAN. You do not know when that idea originated?

M. LAMPRE. No.

The CHAIRMAN. What was the actual purpose and object of the letter to the President of the United States and the letters and telegrams of Cromwell, attorney, given with the message of the President of February 20, 1900? What was the actual purpose and object of the letter to the President of the United States of the 18th day of November, 1898?

Mr. LAMPRE. As far as I can recollect, the purpose was to lay the whole subject before the United States; and at the time we stated that, should the United States abandon the idea of constructing the Nicaragua Canal, we were ready to reorganize under the laws of this country and to organize an American corporation to complete the Panama Canal, which we thought the best route and still think the best route. That is why we laid the whole subject before the United States at the time.

The CHAIRMAN. In addition to this cheerful picture of the resources of the company, these letters boast of the conciliation of Colombia, and that the entire feasibility and practicability of completing the canal is established by the members of two commissions who were the most distinguished men in their professions. Why did not a canal that was so well fortified in its appeal to public confidence obtain the money to complete it by subscriptions among the French people who had already sunk \$250,000,000 in it and only had the ditch, the buildings, the machinery, and the material on hand to show for this expenditure?

M. LAMPRE. Just as I told you, Senator, on account of the contemplated building by the United States of the Nicaragua Canal.

The CHAIRMAN. Which of the boards of engineers which you mentioned in this letter adopted the plan of supplying this canal with water to float ships by the use of pumping machinery?

M. LAMPRE. I must decline to answer technical engineering questions. I am no engineer.

The CHAIRMAN. It is not a question of technical engineering. I want to know which one of these boards recommended the plan of pumping water into the canal. You have indorsed every one of them as being men of the highest responsibility.

M. LAMPRE. Both of them.

The CHAIRMAN. Which of the boards recommended the plan of pumping water into the canal?

Mr. LAMPRE. I believe that is the old company's plan, is it not?

The CHAIRMAN. I wanted your recollection about that.

M. LAMPRE. I have no recollection at all as to that. That is beyond me.

The CHAIRMAN. You would not take that as one of the evidences of the practical ability of the corps of engineers?

M. LAMPRE. I do not know. I have no idea of that. I am no engineer whatever. I can not presume to say anything as to the technical aspect of the case.

The CHAIRMAN. With such resources as the letter of the 18th of November, 1898, described, why did not the new Panama Canal Company complete the canal with locks, after abandoning the sea-level canal, as it is stated in this letter?

M. LAMPRE. That is another technical question, Senator.

The CHAIRMAN. Why they did not?

M. LAMPRE. Yes.

The CHAIRMAN. It was not for want of means, was it?

M. LAMPRE. I do not know about your technical questions.

The CHAIRMAN. The question of want of means can not be technical between the secretary of the company and the company itself?

M. LAMPRE. Perhaps I do not catch the question properly. Please state it again.

The CHAIRMAN. I will repeat it. With such resources as that letter of the 18th of November, 1898, described, why did not the new Panama Canal Company complete the canal with locks after abandoning the sea-level canal, as is stated in this letter?

M. LAMPRE. I think I have answered something of the same question by stating that it was on account of the contemplated building of the Nicaragua Canal by the United States. We would not enter at the time in rivalry with the United States.

The CHAIRMAN. How many levels did these two commissions agree to recommend for the lock canal, and what was the lift or height of each of them?

M. LAMPRE. That is quite technical; that is beyond me, Senator.

The CHAIRMAN. You do not know anything about that?

M. LAMPRE. I could not answer it; I might make a mistake.

The CHAIRMAN. You can answer this question, I presume. Did they adopt any plan as to the levels of their canal which was adopted by the corporation of which you are the secretary?

M. LAMPRE. Yes; the plan has been adopted, and it is embodied in the report of the commission.

The CHAIRMAN. Did the two commissions agree as to such plan?

M. LAMPRE. Quite so.

The CHAIRMAN. In what respects did they differ, if at all, as to the levels?

M. LAMPRE. Oh, I do not know about that, Senator.

The CHAIRMAN. Whether there should be one, two, three, or four levels?

M. LAMPRE. I must decline answering the technical questions.

The CHAIRMAN. I want to know what the company did. You are its secretary. I want to know what plan the company ever adopted.

M. LAMPRE. The plan recommended by the special commission, the names of the members of which you have in your report.

The CHAIRMAN. They have recommended three different plans?

M. LAMPRE. Yes.

The CHAIRMAN. Have they adopted them all?

M. LAMPRE. They have adopted at the present time the plan at level 29, I believe.

The CHAIRMAN. That is the Obispo level?

M. LAMPRE. Yes; as far as I can say. I must be very cautious about technical matters.

The CHAIRMAN. I know you must, and so must I.

M. LAMPRE. I know nothing about it at all.

The CHAIRMAN. The company has finally adopted the Obispo level?

M. LAMPRE. I do not know whether it is the Obispo level or the other.

The CHAIRMAN. It is 29, you think?

M. LAMPRE. I believe it is.

Senator MITCHELL. Is it not a fact that the new company has absolutely abandoned all idea of a sea-level plan?

M. LAMPRE. At the present time, yes; but the company claims that once the regular canal is built the sea-level canal might be constructed. That is what the engineers claim, to my understanding.

The CHAIRMAN. Did these two boards of engineers agree on the very important matter of recommending a clay dam across the Chagres River at Bohio?

M. LAMPRE. I believe both boards agreed on everything. That is my opinion.

The CHAIRMAN. Did they agree as to the manner of feeding the canal with water from the upper Chagres River?

M. LAMPRE. That is technical again, but I think they do agree.

The CHAIRMAN. It is as to a fact.

M. LAMPRE. I may state positively that they do agree.

The CHAIRMAN. Did they agree as to piping the water in iron tubes, inverted siphons, tunnels, and ditches from Alajuela to the main canal, which was more than 10 miles distant from that point?

M. LAMPRE. I do not know about that. The question of pumping water is quite foreign to me. I know nothing about that.

The CHAIRMAN. The report of the Isthmian Canal Commission, which I have here, shows that the canal ditch from Bohio to the seaboard has filled up in many places and for long distances. Was that misfortune occasioned by the neglect of the new company or because of fruitless efforts to control the flood waters of the Chagres River?

M. LAMPRE. I know nothing about it, sir. I know nothing about these questions.

The CHAIRMAN. You say in that letter you had money on hand, plenty of it, and did not need any?

M. LAMPRE. Yes; we did say so, I believe.

The CHAIRMAN. I read it to you?

M. LAMPRE. Yes.

The CHAIRMAN. And that you have expended upon that canal how many francs since you went into possession?

M. LAMPRE. I stated the figure. It seems to me it ought to be about 44,000,000 francs at the present time. Senator, I may be mistaken in the figure, but it is in the neighborhood of that figure.

The CHAIRMAN. It is a large sum of money.

M. LAMPRE. Yes; it is a large sum of money.

The CHAIRMAN. Was any serious effort made to prevent this filling up of the main sea-level channel of the canal?

M. LAMPRE. I know nothing about that. I guess efforts have been made. I know nothing about it.

The CHAIRMAN. If there was not——

M. LAMPRE. No; I think not.

The CHAIRMAN. No effort was made?

M. LAMPRE. In fact, I do not know. I would rather say that I do not know.

The CHAIRMAN. If no effort was made, was it because of want of money?

M. LAMPRE. I do not know. My opinion about engineering questions——

The CHAIRMAN. They had the money?

M. LAMPRE. Yes; the money was at hand.

The CHAIRMAN. And you have 16,000,000 francs in your treasury yet?

M. LAMPRE. I guess we have; yes, sir.

The CHAIRMAN. Yet the canal has been allowed to fill up?

M. LAMPRE. I do not know about that.

The CHAIRMAN. Does that comport with the idea of it being the intention of this canal company at any time to complete that canal, or did they actually abandon it and merely put it upon the bargain counter as something to attract the attention of purchasers?

M. LAMPRE. No; nothing of the kind. You see, Senator, the particular effort of the company has been on the Culebra cut, because it had been shown as the obstacle in the way of building the canal, and they wanted to know whether that obstacle could be removed. So the principal effort of the company was on that very point, the other questions appearing to be of less importance and the fillings in of sections of the canal to be easily removed later on. They wanted to make it appear to public opinion that the Culebra Mountain might be got rid of, and, to my understanding, according to the opinion of the engineers, that evidence has been accomplished by the company.

The CHAIRMAN. Well, why did you want to make that plain?

M. LAMPRE. I answered the question you put to me, Senator. You asked me why there had been no effort made, or whether an effort had been made, to get rid of the fillings of the canal, and I wanted to explain that very thing in case an effort had been made or had not been made, telling you that the principal effort of the company had been as to the Culebra cut and these fillings, not being considered as of great importance, to be left to be got rid of in the future.

The CHAIRMAN. You stated, if I remember what you said, that the company wanted to make it plain that they could cut through the Culebra Pass?

M. LAMPRE. Yes; and so they have, according to the opinion of our engineers.

The CHAIRMAN. To whom did they want to make it plain?

M. LAMPRE. To everybody; to the whole world.

The CHAIRMAN. Why?

M. LAMPRE. Because it had been thought in bygone times that the Culebra cut could not be accomplished at all.

The CHAIRMAN. What interest had any person in the world in it except the stockholders of the new company and the Government of Colombia?

M. LAMPRE. To make sure that the canal was feasible.

The CHAIRMAN. Who else was interested in that question except the stockholders and the Government of Colombia?

M. LAMPRE. The company itself.

The CHAIRMAN. Well, and the company itself.

M. LAMPRE. Everybody was interested in it; and should we after a time apply to the public to raise the money, of course we would have to make that clear.

The CHAIRMAN. You say you never have made any effort to raise money?

M. LAMPRE. No, we have not, but we might have to do it; and, on the other hand, should we wish to make the subject quite clear to the United States that the canal is feasible, we were to do that.

The CHAIRMAN. Then, if I gather your view of it, the company, having money to keep this property in a state of preservation and keep the canal open from Bohio Bay to the sea, permitted it to fill up and took no care of it?

M. LAMPRE. I do not know about that. I know nothing about what the company did as to engineering.

The CHAIRMAN. These reports state it.

M. LAMPRE. What the reports state must be correct.

The CHAIRMAN. The French engineers did it.

M. LAMPRE. I am not to form an opinion of the French engineers. I know nothing about it.

The CHAIRMAN. Being in that situation, the company thought it was advisable to devote their attention to the Culebra cut in order to demonstrate the practicability of the canal?

M. LAMPRE. That is what I said.

The CHAIRMAN. Now, why did they want to demonstrate the practicability of the canal?

M. LAMPRE. Because if the canal was to be built at all, it ought to be known that it could be built.

The CHAIRMAN. To whom?

M. LAMPRE. To the whole world, to France. When we started into that business we contemplated building the canal, and, of course, we were to show that it could be built. Assuming that we had attempted to raise the money and not have made certain that the canal was feasible we would have failed, and that we did not wish to do.

The CHAIRMAN. Were you trying to convince Colombia that the canal was feasible in order to get an extension of your leases?

M. LAMPRE. Well, at the time, the extension of the concession had not been investigated into, but, of course, Colombia ought to be convinced also that the canal was feasible.

The CHAIRMAN. Was it not the real object of that concentration of the powers of the canal company and its money upon Culebra Pass to convince the Government and people of the United States that that canal was feasible?

M. LAMPRE. No, sir; the object of the company was to convince the public in France that the canal was feasible, because, as I stated, the object of the company was to build the canal, and, of course, if the company was to build it, it ought to make certain to everybody that it might apply to, that is to say in France, to raise money, that the canal was feasible. It only turned out later that we thought it best, having to face the possibility of the construction of the Nicaragua canal by the United States, to enter into negotiations with the United States Government, if possible; but at the time the company was organized and entered into the work of the canal and made that great demonstration at the Culebra cut, it was with the object of raising the money for completing the canal.

The CHAIRMAN. I believe you have stated that 60,000,000 francs have been paid into the treasury?

M. LAMPRE. Yes, sir.

The CHAIRMAN. And that that had all been expended except 16,000,000 francs?

M. LAMPRE. Yes, sir; about that.

The CHAIRMAN. About 16,000,000 francs?

M. LAMPRE. Yes, sir; about 16,000,000.

The CHAIRMAN. Now, what part of this money has been paid for actual labor during that time?

M. LAMPRE. Oh, I do not know about that.

The CHAIRMAN. Is it not a part of your duty as secretary to understand anything about it?

M. LAMPRE. No; I can not say anything about that. The greatest part of it of course——

The CHAIRMAN. Whose duty is it in that company——

M. LAMPRE. The engineers of the company.

The CHAIRMAN. To be able to answer a question like that?

M. LAMPRE. The chief engineer of the company, Mr. Choron, who appeared before the committee of the Senate two years ago.

The CHAIRMAN. Mr. Choron is not the treasurer of this company?

M. LAMPRE. He is the chief engineer of the company.

The CHAIRMAN. Whose business is it to ascertain how much money has been received and how much has been expended and what it was expended for?

M. LAMPRE. Whose duty is it?

The CHAIRMAN. Yes.

M. LAMPRE. To ascertain how much money has been received?

The CHAIRMAN. How much has been received, how much expended, and what it was expended for?

M. LAMPRE. It is the management's duty.

The CHAIRMAN. Have they no secretary nor clerk who has charge of that business?

M. BOEUFVÉ. The treasurer.

M. LAMPRE. Yes; but I do not know at the present time, and I can not state how much has been expended in the work proper. I think that is set forth in some of the documents which have been given to the Inter-oceanic Canal Commission. It might appear there in documents set before them, and even in their own report perhaps.

The CHAIRMAN. Have you, as secretary, no supervision of and no acquaintance with the financial affairs of this company?

M. LAMPRE. Oh, yes; but it is not my special department. There is a financial agent in Paris who is more than I am in charge of financial questions. I only see it in a general way.

The CHAIRMAN. Now, in a general way, how much of this money has been expended on labor?

M. LAMPRE. I do not know.

The CHAIRMAN. You do not know?

M. LAMPRE. I do not know, myself.

The CHAIRMAN. How much of it has been spent in the United States?

M. LAMPRE. None at all, to my understanding.

The CHAIRMAN. For any purpose?

M. LAMPRE. No; certainly not.

The CHAIRMAN. I ask you that question because the old company put \$1,500,000 in New York——

M. LAMPRE. Not a farthing has been spent in the United States.

The CHAIRMAN. And I thought you might have been doing the same thing.

M. LAMPRE. Not a farthing has been spent in the United States except the fee of the United States agent in New York, Mr. Boyard.

The CHAIRMAN. As your counsel?

M. LAMPRE. And the expenses of attorneys here from time to time; that is all.

The CHAIRMAN. Have you paid any interest out of this fund upon any debts whatever—the old debts?

M. LAMPRE. No, sir; we have no debts whatever.

The CHAIRMAN. Neither to the new stockholders nor to the old?

M. LAMPRE. We have no debts whatever, and no interest has been paid to anybody.

The CHAIRMAN. So whatever money you had there has been absorbed entirely in this work?

M. LAMPRE. Exactly, exactly; with no exception at all.

The CHAIRMAN. From what sources was the 60,000,000 francs received?

M. LAMPRE. From the subscription of stockholders; from subscribers. One is the old company.

The CHAIRMAN. How much stock was subscribed?

M. LAMPRE. Sixty million francs.

The CHAIRMAN. Has it been all paid, including the subscription of the old company?

M. LAMPRE. All paid in at the present time.

The CHAIRMAN. Not in bulk, but from time to time, I suppose?

M. LAMPRE. From time to time.

The CHAIRMAN. As you wanted to collect it?

M. LAMPRE. Yes.

The CHAIRMAN. Did you ever authorize any issue of bonds?

M. LAMPRE. No, sir.

The CHAIRMAN. How much did this new company receive from the assets of the old company—I mean cash assets.

M. LAMPRE. None at all.

The CHAIRMAN. None whatever?

M. LAMPRE. None whatever. The cash assets were quite left outside of the whole transaction.

The CHAIRMAN. So that the \$13,000,000 that we hear spoken of as the new fund was entirely paid in by the new stockholders?

M. LAMPRE. Quite so.

The CHAIRMAN. Were there no resources left of the cash assets of the company at the time of the dissolution?

M. LAMPRE. Oh, yes; the old company had cash assets left, but it was not transferred to us.

The CHAIRMAN. What became of it?

M. LAMPRE. It is left in the treasury of the liquidation to be divided in the future between the bondholders and parties interested.

The CHAIRMAN. What is the amount of that fund?

M. LAMPRE. I do not know at all.

The CHAIRMAN. Is it large or small?

M. LAMPRE. Oh, I do not know at all.

The CHAIRMAN. You have no idea?

M. LAMPRE. I could not state.

The CHAIRMAN. What do you do with the proceeds of the earnings of the Panama Railroad?

M. LAMPRE. The earnings of the Panama Railroad? We did not get

any yet, except last year a dividend which has been invested into the general expenditures of the company.

The CHAIRMAN. The canal company?

M. LAMPRE. The canal company.

The CHAIRMAN. Is the Panama Railroad under a separate management from that of the canal company?

M. LAMPRE. Oh, quite so; quite a separate administration. We only own stock of the Panama Railroad.

The CHAIRMAN. How much stock?

M. LAMPRE. Sixty-eight thousand five hundred and thirty-four shares, to my recollection.

The CHAIRMAN. The whole amount of stock was how much?

M. LAMPRE. Seventy thousand shares. We have the majority by far, of course.

The CHAIRMAN. You have all, then, but about 1,500 shares?

M. LAMPRE. A thousand or twelve hundred.

The CHAIRMAN. Where is that held?

M. LAMPRE. In Paris.

The CHAIRMAN. It is all in Paris?

M. LAMPRE. Yes, sir. You mean the stock owned by the company?

The CHAIRMAN. No; I mean the other stock.

M. LAMPRE. Oh, I do not know.

The CHAIRMAN. I thought you did not know.

M. LAMPRE. Oh, I do not know. It is owned mostly, I believe, in the United States, but I do not know.

The CHAIRMAN. Who is the president at this time of that railroad company?

M. LAMPRE. Mr. Simmons.

The CHAIRMAN. Where does he live?

M. LAMPRE. In New York.

The CHAIRMAN. Can you give me his initials?

M. LAMPRE. Edward Simmons, I think.

M. BŒUFVÉ. He is president of the Fourth National Bank in New York.

The CHAIRMAN. Have you any knowledge of an agreement between the Pacific Mail Steamship Company and the Panama Railroad Company as to the transportation of freight across the Isthmus?

M. LAMPRE. No, sir.

The CHAIRMAN. You have no knowledge of it?

M. LAMPRE. No, sir.

The CHAIRMAN. No such agreement is recorded in the company's books?

M. LAMPRE. No, sir; not to my knowledge.

The CHAIRMAN. You have never seen it?

M. LAMPRE. No.

The CHAIRMAN. You never have been informed as to its terms by any officer of the company?

M. LAMPRE. No.

The CHAIRMAN. Do you know who is the treasurer of the Panama Railroad Company now?

M. LAMPRE. It is Mr. Deming, I believe.

Senator MITCHELL. Did the railroad company ever issue any bonds?

M. LAMPRE. Oh, yes, sir.

Senator MITCHELL. Are any of them outstanding?

M. LAMPRE. Oh, yes. I could not name the figure, but I know they are outstanding.

Senator MITCHELL. Your proposition, as I understand it, includes the Panama Railroad?

M. LAMPRE. The stock of the road that we own.

Senator MITCHELL. If there are bonds outstanding the purchasers, of course, become responsible for the bonds?

M. LAMPRE. I do not know about that.

Senator MITCHELL. About how many bonds do you think are out of the Panama Railroad Company?

M. LAMPRE. I do not know. I have not an idea.

The CHAIRMAN. I have a statement here which purports to be taken from the official reports of the Panama Canal Company to this effect: Up to July, 1890, the total expenses at Panama had been £31,330,937.

M. LAMPRE. It must be true, of course.

The CHAIRMAN. The total expenses in Paris had been £15,628,066.

M. LAMPRE. That must be francs.

The CHAIRMAN. It is pounds here.

M. LAMPRE. Please name the figures again.

The CHAIRMAN. Total expenses at Panama, £31,330,937.

M. LAMPRE. The new company?

The CHAIRMAN. Oh, no.

M. LAMPRE. The old company?

M. BŒUFVÉ. The railroad.

M. LAMPRE. The railroad. It may be, I do not know. I thought you were speaking of our company.

The CHAIRMAN. "Purchase of Panama Railway shares £3,730,727."

M. LAMPRE. It may be; yes, that is the old company. That is the beginning of the old company.

The CHAIRMAN. That is over fifteen and a half million dollars. "Payments to the Civil Society of Obligations for the lottery scheme, £1,290,587."

M. LAMPRE. I suppose the figures are correct.

The CHAIRMAN. "Payment to the Colombian Government, £98,203. The total is £52,078,520."

M. LAMPRE. I should like to know, please, Senator, what document that is you are just reading?

The CHAIRMAN. It is the work of Mr. Colquhoun—"The Key of the Pacific."

M. LAMPRE. I can not testify to that; I know nothing about it.

The CHAIRMAN. The author says this about it:

"The magnitude of the enterprise is shown by the following official figures of the liquidator, dated July, 1890."

Then follow the figures which I have given.

M. LAMPRE. I do not know anything about it.

The CHAIRMAN. I understand; but I want to get you to make an explanation, and that is principally my reason for bringing this to your attention. What is that lottery scheme?

M. LAMPRE. It is the lottery scheme of the old company. In 1888 the old company was authorized by the Parliament in France to issue lottery bonds, which it did for the amount of 72,000,000 francs. But the issue was not all taken, you see. Part of it was left in the old company's treasury, because it was not subscribed.

The CHAIRMAN. Is that scheme in existence yet?

M. LAMPRE. Yes; it is in existence.

The CHAIRMAN. The lottery scheme?

M. LAMPRE. Yes, sir.

The CHAIRMAN. It is still in existence?

M. LAMPRE. Oh, yes; a special corporation.

The CHAIRMAN. And the new company has the benefit of it?

M. LAMPRE. No, sir; the new company has nothing to do with it.

The CHAIRMAN. Why has not the new company the benefit of that scheme?

M. LAMPRE. Because it was not transferred to the new company. It was left outside of the transfer.

The CHAIRMAN. It was not transferred?

M. LAMPRE. No, sir.

The CHAIRMAN. "Payment to the Colombian Government, £98,203."

M. LAMPRE. That is about the concession, I believe.

The CHAIRMAN. About how much have you paid to the Colombian Government since the new company was formed for its concessions?

M. LAMPRE. We have paid 7,500,000 francs and 5,000,000 francs more; that is, about 12,000,000 francs.

The CHAIRMAN. Has that been an annual stipend, or did you pay it when you got a renewal of your concessions?

M. LAMPRE. We paid part of it under the concession of the old company by installments, from time to time, and when we obtained lately—that is, two years ago—the second, another extension of the concession, we paid 5,000,000 francs in one payment.

The CHAIRMAN. Did the Colombian Government put up the price on you when you got the new concession?

M. LAMPRE. Yes; the 5,000,000 francs was the compensation of the extension of the concession.

The CHAIRMAN. How long, under your concession, are you compelled to pay these stipends?

M. LAMPRE. We have nothing to pay at the present time. We have paid all we were bound to pay. The extension of the concession was granted us under consideration that we would pay 5,000,000 francs. We have paid these 5,000,000 francs, and we have nothing more to pay now.

M. BŒUFVÉ. Having paid the 5,000,000, we have done what we were bound to do and nothing else.

The CHAIRMAN. After you paid the first demand for the old company the Colombian Government charged you 5,000,000 in addition?

M. LAMPRE. Yes, because we demanded a new extension of the concession they charged us 5,000,000 francs which have been paid.

The CHAIRMAN. Is there not an annual sum which was to be paid by the new Panama Company?

M. LAMPRE. No, sir.

The CHAIRMAN. The interest in the profits or earnings of the canal?

M. LAMPRE. There would be something to be paid when the canal would be completed and operated, but at the present time we have nothing to pay.

The CHAIRMAN. What is that sum?

M. LAMPRE. I might find it in the concession; I have not it present to my mind; but sums varying according to the benefits of the canal.

The CHAIRMAN. What percentage of the net earnings?

M. LAMPRE. It depends; from the first year to so many years it is so much, but I have not a recollection of it at the present time.

The CHAIRMAN. When does the lease expire?

M. LAMPRE. Ninety-nine years from the time of the opening of the canal.

The CHAIRMAN. What becomes of the property then?

M. LAMPRE. It goes back to the Colombian Government.

The CHAIRMAN. So you have ninety-nine years of ownership and control?

M. LAMPRE. After the canal is opened.

The CHAIRMAN. Paying the Colombian Government a certain percentage of the income derived?

M. LAMPRE. That is it, sir. You will find that in the concession. I guess you have got it.

The CHAIRMAN. I know, but I wanted to call your attention to it.

M. LAMPRE. I have not got the figures in mind at the present time. It is easily investigated upon.

The CHAIRMAN. Now, I want to read to you the second proposition made by your company to the United States.

M. LAMPRE. Yes, sir.

The CHAIRMAN. That was made on February 28, 1899.

[Mr. Hutin and Messrs. Sullivan and Cromwell to the President.]

“NEW YORK, *February 28, 1899.*

“SIR: 1. The New Panama Canal Company has never proposed and does not seek any appropriation or financial aid from the Government of the United States in the completion of its canal.”

M. LAMPRE. Yes, sir.

The CHAIRMAN. Was that because you were able to complete the canal yourselves?

M. LAMPRE. So we thought at the time. We were able at the time, as we thought, by reorganizing the company under American law and by private subscription, to raise the money.

The CHAIRMAN. The first proposition, which we have discussed, manifestly beyond the power and ability of the canal company to complete its work, was dated November 18, 1898, and this is dated February 28, 1899.

M. LAMPRE. Yes, sir.

The CHAIRMAN. I take it that the purpose of this communication was not to get any money or assistance from the Government of the United States of any kind.

M. LAMPRE. So it says, and it is correct; yes, sir.

The CHAIRMAN. The letter of February 28, 1899, proceeds as follows:

“2. It places its canal works on the Isthmus of Panama subject to the examination of this Government, or any special commission through whom it may be desired to make such examination, and will facilitate in every possible way any such desire of the Government.”

M. LAMPRE. Yes, sir.

The CHAIRMAN (reading):

“3. The Government will find that fully two-fifths of the canal works are already constructed; that continuously during the past four years from 3,000 to 4,000 men, under a large force of engineers, have been and are now actually engaged upon its works; that all technical and physical problems have been solved by the eminent ‘international engineering commission,’ whose report of November 18 last is before you; that the canal is undoubtedly feasible, and the

harbors at both ends natural harbors and entirely satisfactory; that its concessions are perfect and unquestioned, and that the relations of the United States to the canal are especial and superior by reason of the 'special and remarkable advantages' secured to it by the treaty of 1846 between the United States and Colombia, and which rights, whatever they may be, were scrupulously respected, observed, and confirmed in the concessions of Colombia to the Panama Canal Company, under which the canal is being completed."

M. LAMPRE. Yes, sir.

The CHAIRMAN. That means that our protection of Panama, of the canal and the railroad down there, is an asset of the Panama Canal Company.

M. LAMPRE. Well, I do not know that I would take it in that way.

The CHAIRMAN. That is what is said here in substance:

"4. While the New Panama Canal Company does not seek any financial aid from the Government, it recognizes the national sentiment in favor of acquiring some pecuniary interest in any canal connecting the Atlantic and Pacific oceans. Therefore, the New Panama Canal Company declares that if, as the result of any such investigation, the Government of the United States adopts the Panama route, the company, if the Government so desires, will reincorporate under the laws of the State of New York (under the laws of which State the Panama Railroad Company has existed for nearly fifty years) or of some other State of the Union, subject to the provisions of its concession, and vest its concessions and property in such corporation."

Was there a corporation formed just before that time, a month or two, called "The New Panama Canal Company of America?"

M. LAMPRE. Yes, sir.

The CHAIRMAN. What connection is there between this proposition and that corporation?

M. LAMPRE. I think the connection was the execution of that proposition; that is to say, to reorganize the company under American law and attempt to have the United States interest represented in the new company under the conditions the United States might require.

The CHAIRMAN. You had already prepared this new charter company with that name for the purpose?

M. LAMPRE. No, sir; it was not prepared at the time we made the proposal.

The CHAIRMAN. Sir?

M. LAMPRE. I do not think it was prepared at the time we made the proposal.

The CHAIRMAN. Well, suppose it was not at the time; was it afterwards prepared for that purpose?

M. LAMPRE. I do not know about that, but it seems that it must have been.

The CHAIRMAN. The attorney of the company is a witness to the charter.

M. LAMPRE. The attorney of the company?

The CHAIRMAN. Yes; Cromwell.

M. LAMPRE. Yes; I believe he was.

The CHAIRMAN. Now, was not that incorporation gotten up for the purpose of executing this proposal if the United States accepted it?

M. LAMPRE. Yes, sir.

The CHAIRMAN. That is what I wanted to get at.

M. LAMPRE. Yes, sir.

The CHAIRMAN. Then, the proposition was that the Government of the United States should take stock in one of the State corporations?

M. LAMPRE. Yes, sir.

The CHAIRMAN. In order to get an interest in this canal?

M. LAMPRE. Yes, sir; quite so.

The CHAIRMAN (reading):

"It will also in said event accord to the United States such representation in its board of directors, and such opportunity to acquire an interest in its securities, as may be permitted by its concessions, which, of course, must be scrupulously observed."

M. LAMPRE. Yes, sir.

The CHAIRMAN (reading):

"And further, if the United States should desire to perpetuate or enlarge its existing rights and privileges acquired under said treaty of 1846 the company will conform to such supplemental treaty as may be entered into between the United States and Colombia.

"We beg leave to say that yesterday, at a public hearing accorded us by the Committee on Rivers and Harbors of the House of Representatives, we submitted to the chairman and gentlemen of that committee a communication to the foregoing purport, and have the honor to be,

"Your obedient servants,

"MAURICE HUTIN,

"*Director-General of the New Panama Canal Company.*

"SULLIVAN & CROMWELL,

"*General Counsel, New York City.*"

Do you remember what particular legislation was going on in Congress at that time?

M. LAMPRE. No, sir. I think, to my recollection, at the time, the Nicaragua bill, the Hepburn bill, was under discussion, but I have no particular recollection.

The CHAIRMAN. That was before the Hepburn bill.

M. LAMPRE. It was before?

The CHAIRMAN. Yes.

M. LAMPRE. I forget the bill.

The CHAIRMAN. Was it not when the Senate had passed by a vote of 6 to 48 a bill to build the Nicaragua Canal for the Maritime Canal Company? Was it not just at that time?

M. LAMPRE. I do not know; I forget.

The CHAIRMAN. Was it not while that bill was pending in the House?

M. LAMPRE. I believe a bill was pending in the House at the time—oh, yes; but what particular bill it was I forget at the present time.

The CHAIRMAN. And your company went before that committee with this proposition?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Then you proposed to transfer everything out of France into the United States?

M. LAMPRE. At the time?

The CHAIRMAN. Yes, sir.

M. LAMPRE. Yes, sir.

The CHAIRMAN. To get rid of the French Government and the French courts?

M. LAMPRE. Nothing to do with the French Government.

The CHAIRMAN. And the French courts?

M. LAMPRE. Nothing to do with the French courts.

The CHAIRMAN. You are the most independent set of gentlemen I have ever known to be in a country and to be independent of the Government.

M. LAMPRE. We propose at the present time to transfer the whole property to the United States for \$40,000,000.

The CHAIRMAN. And remove the corporation over here?

M. LAMPRE. Oh, at that time.

The CHAIRMAN. In New Jersey, where the Government of the United States could take stock in one of these New Jersey corporations and would have representation in the board in proportion to the stock that it took.

M. LAMPRE. We thought it might have been done. The same thing exists with the Suez Canal.

The CHAIRMAN. Now, if you were not wanting to borrow money from the United States or to get any appropriation, and if you felt then as strong as you did in the preceding November as to your power to complete the canal, why did you propose to transfer it to the United States and put it under the wing of a New Jersey corporation?

M. LAMPRE. The same answer as before, Senator. Because we thought that if the United States was to build the Nicaragua Canal we might be in great difficulty to raise the money.

The CHAIRMAN. Was it not also because you had abandoned all hope of recommending your canal to the French people?

M. LAMPRE. Oh, no, sir; no, sir; not at all.

The CHAIRMAN. Do you think that you could have gone back from the United States with a New Jersey corporation and have gotten the French people from whom you had cut loose entirely to subscribe to your stock and complete that canal?

M. LAMPRE. Oh, yes, sir; without the rivalry of the Nicaragua Canal; oh, yes.

The CHAIRMAN. Do the French people take no patriotic view in regard to this canal? Was it a mere money making scheme?

M. LAMPRE. Well, you know they had a patriotic view, but circumstances are circumstances.

The CHAIRMAN. On the 11th of March, 1899, a very few days after this, Mr. Hutin and the attorneys address another letter to the President. It is as follows:

“COMPAGNIE NOUVELLE DU CANAL DE PANAMA,
“45 Wall Street, New York City, March 11, 1899.

“To the PRESIDENT:

“Referring to the act of Congress approved on the 4th instant respecting an investigation of the Panama and Nicaragua canals, the New Panama Canal Company, as one of the subjects of the inquiry, respectfully invites attention to its communication addressed to you December 2, 1898, and to its subsequent offers to the honorable Secretary of State, and finally to its official proposition of February 27 last, all of which contain the proffer and urgent invitation that the President or Congress make the fullest investigation of the canal works, plans, seven concessions, and status of the New Panama Company; and it also refers to the official report upon the canal made by the International

Technical Commission November 16, 1898, and placed in your hands by us on December 2 last.

"The said act of Congress is therefore in full accord with our repeated offers and our warmest desires.

"We again most respectfully renew our proffer of the fullest investigation and our offer of all the facilities to that end. But the subject is of such transcendent consequence to the United States, to the people of the world as well as to ourselves, that we venture, with due respect, to submit this our petition that any commission designated to aid you in making the investigation and comparison contemplated by the act of Congress be composed of gentlemen of the widest experience, of exceptional character and unquestioned professional standing, and who are not embarrassed by public committals or previous records favorable or unfavorable to either one or the other project and who have not heretofore served upon any canal commission.

"The New Panama Canal Company does not present or suggest any name for membership of any commission. Its only petition is that the selection be of gentlemen whose conclusion will at once command public confidence, fully relying upon its ability to satisfy fair and impartial investigation of the merits of its canal.

"THE NEW PANAMA CANAL COMPANY,
"By MAURICE HUTIN, *Director-General*.
"SULLIVAN & CROMWELL, *General Counsel*."

Did that letter receive the approval of your company?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Then you proposed to dictate to the President of the United States whom he should not appoint on that board?

M. LAMPRE. We did not propose to dictate anything. We asked what we thought we would like to get.

The CHAIRMAN. Is not this a plain dictation: "You shall not appoint any one who has been a member of the board heretofore?"

M. LAMPRE. We did not propose to dictate anything, but only expressed our sincere desire as to that. We would not presume to dictate anything to the United States.

The CHAIRMAN. That particular feature of this case, followed by another, led me to suppose that we might expect any overture from your company that might be brought to our attention without respect to whether it was one that we ought properly to consider or not. That is the impression made on my mind, and I want to be frank in stating it to you. Any explanation necessary to be made about that, of course, is in order.

M. LAMPRE. I have nothing to say to that.

The CHAIRMAN. I notice here that Mr. Boyard, under the date of Paris, January 6, 1900, says: "Board of management has resigned."

M. LAMPRE. Yes, sir.

The CHAIRMAN. That is the new corporation?

M. LAMPRE. No, sir; the board of management may resign and new directors are appointed; that does not change the corporation at all with us.

The CHAIRMAN. I did not say that it changes the corporation.

M. LAMPRE. I understood you to say it was a new corporation.

The CHAIRMAN. I said the board of management of the new corporation.

M. LAMPRE. Yes, sir; the new company.

The CHAIRMAN (reading): "I have been appointed, by decision of the court, sole temporary manager of the new Panama Canal Company, instead of the board of management, and with its powers."

M. LAMPRE. Yes, sir.

The CHAIRMAN. If your company is entirely independent of the Government and the courts of France, how is it that the court there can appoint a manager to take the place of one who has served?

M. LAMPRE. I will explain. Whenever in France there happens an event similar to the thing referred to there—that is to say, the resigning of a board of administration, pending the time necessary to call a stockholders' meeting, whose duty it is to appoint new directors—the court has, under the general law of France, authority to appoint a temporary director or manager, whose duty it is, pending the time necessary for calling the new meeting of the board, to take the management of the business. That is his sole duty. A few weeks after the appointment of that temporary management a stockholders' meeting was called by the company and a new board appointed. But it has no other effect of any kind at all, and the action of the court is taken only under the general law of France.

The CHAIRMAN. Then, of course, under the general law of France——

M. LAMPRE. And, allow me to say, it is done because such action is requested by the resigning board from the court itself.

The CHAIRMAN. Under the general laws of France, therefore, the courts there have jurisdiction of your company, the New Panama Canal Company?

M. LAMPRE. Under the general law, yes.

The CHAIRMAN. To control it?

M. LAMPRE. Yes.

The CHAIRMAN. To direct it?

M. LAMPRE. Under the general law?

The CHAIRMAN. Yes; prohibiting it from doing anything that is improper or illegal? In other words, your courts in France, under the general law, have the jurisdiction now of the New Panama Canal Company?

M. LAMPRE. For certain matters, such as this one.

The CHAIRMAN. Well, it has jurisdiction.

M. LAMPRE. Pending the absence of a management, and pending the calling of a stockholders' meeting, because the stockholders' meeting is in fact the sole authority to transact any business for the corporation.

The CHAIRMAN. Suppose the Congress of the United States had accepted your proposition, the second that I have stated here, to transfer the corporation, with all of its property and its interests and its powers, into this New Jersey corporation, would not the courts of France have the power to prohibit your corporation from doing that thing?

M. LAMPRE. No, sir; it is the same thing as now. The liquidator having agreed to such thing, the stockholders' meeting would be the only authority to approve of the whole matter.

The CHAIRMAN. If your board of directors had adopted such a measure as that, would it not have been considered as a vacation of all their rights and authority under the laws of France?

M. LAMPRE. No, sir; the stockholders' meeting would have had to

approve of the thing, and having approved of it, nobody would have had anything to do with it.

The CHAIRMAN. Would the laws of France transfer themselves across the Atlantic to New Jersey and control it?

M. LAMPRE. It would be quite a new corporation. The laws of France would not control a corporation organized here.

The CHAIRMAN. Could not the laws of France authorize your courts to say to that corporation, "We will dissolve you and you shall not have any charter at all unless you remain here in our jurisdiction?"

M. LAMPRE. No, sir. The dissolution is business for the stockholders alone.

The CHAIRMAN. I do not suppose that France is a liberal Government; it looks to me like an awful despotism, if that is the fact. Then you insist on your statement that if the United States had accepted your proposition that I have read to you, and you should organize a company as you did organize it, and get a charter in New Jersey, and having organized under that charter if you had transferred the corporation with all its rights, privileges, charters, concessions, and property of every sort to New Jersey, a French court would have had no jurisdiction to protect the bondholders or the stockholders who were in France against such an abuse of its laws there?

M. LAMPRE. No, sir; the jurisdiction is the stockholders' meeting and the liquidator, of course.

The CHAIRMAN. I must say to you that if it is in expectation that we will take over this property under such strange laws as you say exist in France, I am afraid it is a very remote chance.

M. LAMPRE. I have nothing to say to that.

Senator FOSTER, of Louisiana. I know you are fatigued with this long examination.

M. LAMPRE. I am at your disposal, sir.

Senator FOSTER, of Louisiana. I do not wish to extend it further, but the question I propose to ask is one very easy to answer.

M. LAMPRE. Very well.

Senator FOSTER, of Louisiana. What limitations or restrictions, if any, did the Republic of Colombia impose upon the company in the concession as to the transfer or sale of its rights?

M. LAMPRE. Not to transfer it to any foreign government; that is all; but they could transfer it to a private corporation or to any individual. The only prohibition was not to transfer the concession to any foreign government whatever.

Senator FOSTER, of Louisiana. I understand, then, that in this concession you are prohibited from transferring or selling your rights or transferring the concession to any foreign government?

M. LAMPRE. Yes; but we are no more now, because we have been relieved from that by the Colombian Government.

Senator FOSTER, of Louisiana. Has any modification of that restriction or prohibition ever been extended to your company by the Colombian Government?

M. LAMPRE. Yes, sir; through the Colombian minister here.

Senator FOSTER, of Louisiana. But has the Colombian Government, either through its Congress or by national action, given any authority of that kind?

M. LAMPRE. The Congress has not acted upon the business to the present time.

Senator FOSTER, of Louisiana. What I wish to arrive at is this: In the event that this Government accepted your proposition, would it become necessary for this transfer to be ratified by the Congress of the Republic of Colombia?

M. LAMPRE. Not that I know of. The Colombian minister has given authority according to instructions received by him, and in my opinion the thing is settled now.

Senator FOSTER, of Louisiana. Your proposition is, of course, to transfer all your rights, concessions, property, and obligations—of course that goes with the transfer—and your company's right to operate and control and manage this canal, which extends ninety-nine years from the completion of a canal?

M. LAMPRE. From the opening of the canal.

Senator FOSTER, of Louisiana. This is the right that you propose to transfer to this Government?

M. LAMPRE. We propose to transfer what we have.

Senator FOSTER, of Louisiana. No right of absolute ownership or perpetual control or management?

M. LAMPRE. No; what we have—that is to say, ninety-nine years from the opening of the canal. We can not go beyond that.

Senator FOSTER, of Louisiana. Now, as a lawyer, is it not your opinion that this transfer, in view of the fact that your concession prohibits a sale to any foreign government, must be ratified or indorsed by the Colombian Government through its channels of legislation?

M. LAMPRE. It might be. I am not making any statement as to that.

The CHAIRMAN. Have you any assurance or promise that the Colombian Government through its agents or by legislation would do this?

M. LAMPRE. No, sir; we have the assurance of the Colombian minister that we may enter into such a transaction with the United States Government.

The CHAIRMAN. He will not consider it a breach of your concession if you come here and confer with us about it?

M. LAMPRE. No, sir; surely not; positively not.

The CHAIRMAN. The next intervention of your company was on the 30th day of April, 1900. That was at the time the Hepburn bill was under consideration, and a day had been set aside as stated in the letter here, which I will enter in the record, but I will not read all of it, unless you want me to read it.

M. LAMPRE. No.

The letter referred to is as follows:

“WASHINGTON, *April 30, 1900.*

“The PRESIDENT:

“Permit us to refer to the communication addressed to you on February 28, 1899, by the Compagnie Nouvelle du Canal de Panama, and of which we attach a copy for your convenience.

“Three days after the above communication (and which was similar to that addressed to the River and Harbor Committee of the House, Hon. Theodore E. Burton, chairman) Congress enacted the law of March 3, 1899.

“Under the powers of said act the President appointed the ‘Isthmian Canal Commission,’ composed of Rear-Admiral John G. Walker, Hon. Samuel Pasco, Mr. Alfred Noble, C. E.; Mr. George S. Morison, C. E.; Gen. Peter C. Hains, Prof. William H. Burr, C. E.; Gen. Oswald H. Ernst, Prof. Emory R. Johnson, Mr. Lewis M. Haupt, C. E.

“In addition to its examination of all other possible isthmian routes the Isthmian Canal Commission has made an exhaustive examination of the plans and status of the company at Paris, where the records of twenty years are preserved, and also personally has examined upon the Isthmus of Panama the actual canal and canal works of the company and the feasibility of its undertaking, and at this time is further verifying surveys, plans, and specifications with a force of 700 to 800 men in the field.

“The Isthmian Canal Commission has not yet made its report to the President, and, as we are advised, has not yet completed its investigations and inquiries upon the technical and other subjects covered by the said act of March 3, 1899, nor has the President yet communicated to Congress his recommendations in the premises.

“In all these investigations concerning the Panama Canal the company has made to the Isthmian Canal Commission the fullest exposition and explanations, without reserve or exception, upon every aspect of the subject concerning which the Commission has desired information, and also has delivered to the Commission full and detailed plans, maps, and specifications of the company for the complete excavation and construction of the Panama Canal and canal works. These documents are great in volume and value, and represent the expenditure of a vast sum, as well as the results of many years of study in their original preparation.

“The company has avoided any action or course which might by the Government be deemed inconsistent with its said communication of February 28, 1899.

“All this the company has done in full reliance upon the avowed purpose of the Government (as embodied in the act of March 3, 1899), of thoroughly and exhaustively investigating and reporting upon all possible isthmian canal routes, and in the reasonable expectation that in the meantime no action would be taken upon the subject by the Congress of the United States inconsistent with the expressed purposes of said act.

“On the contrary, however, and presumably without knowledge of the foregoing facts, measures have been introduced in Congress and are to be acted upon in the House of Representatives May 1 and May 2, 1900, having for their purpose the adoption by the Government of another isthmian canal route, without awaiting the recommendation of the President and the information, report, and conclusions of the Isthmian Canal Commission appointed by the President under the act of March 3, 1899.

“We therefore respectfully request that the President advise the Congress of the facts of the case.

“We have the honor to be, your obedient servants,

“SULLIVAN & CROMWELL,

“*General Counsel Compagnie Nouvelle du Canal de Panama.*”

The CHAIRMAN. It is stated here:

“On the contrary, however, and presumably without knowledge of the foregoing facts, measures have been introduced in Congress and are to be acted upon in the House of Representatives May 1 and May 2, 1900”—

Those are the dates that were set apart by unanimous consent or by the rule of the House for the consideration of what was called the

Hepburn bill, the same bill that was passed by the House the other day—
“having for their purpose the adoption by the Government of another isthmian canal route, without awaiting the recommendation of the President and the information, report, and conclusions of the Isthmian Canal Commission appointed by the President under the act of March 3, 1899.

“We therefore respectfully request that the President advise the Congress of the facts of the case.

“We have the honor to be, your obedient servants,

“SULLIVAN & CROMWELL,

“*General Counsel Compagnie Nouvelle du Canal de Panama.*”

Were they authorized to make that communication?

M. LAMPRE. Most likely they were. I do not know about it. I have no recollection of that at all.

The CHAIRMAN. I was very much in hopes that the company did not know anything about it.

M. LAMPRE. I do not know; I can not tell.

M. BŒUFVÉ, Is it not countersigned by M. Hutin?

The CHAIRMAN. No, but it is signed by Sullivan & Cromwell, general counsel of the company.

M. LAMPRE. He must have acted under the general powers he had as counsel of the company.

The CHAIRMAN. Very good; that binds the company?

M. LAMPRE. I can not say that it does not. I do not know as to that.

The CHAIRMAN. It is addressed to the President of the United States, in the name of the Panama Canal Company, requesting the President of the United States to communicate certain facts by a message—he could not do it in any other way—to the House of Representatives or to Congress upon the statement here that “on the contrary, however, and presumably without knowledge of the foregoing facts, measures have been introduced in Congress, and are to be acted upon by the House of Representatives May 1 and May 2, 1900, having for their purpose the adoption by the Government of another isthmian canal route”—

That is, the Nicaragua route—

“without awaiting the recommendation of the President and the information, report, and conclusions of the Isthmian Canal Commission appointed by the President under the act of March 3, 1899.”

That of course is an intervention on the part of these attorneys with the proper privileges and duties of a House of Congress.

M. LAMPRE. I do not know. The letter is not familiar to me. I could hardly presume to answer.

The CHAIRMAN. I did not suppose it was. I wanted to direct your attention to it. That now is the latest intervention which has been made here for the purpose of interrupting, deferring, preventing action by Congress on this great subject and free choice on the part of the Congress and the people of the United States as between the two canal routes of Nicaragua and Panama, or upon the question whether they will build any or have anything to do with either of them.

Now, that brings me to the third proposition.. That third proposition is contained in many letters which are appended to a report which I had the honor to submit to the Senate, passing between M. Hutin

and Admiral Walker, and some other letters. There is a letter from Mr. Carlos Martinez Silva, minister of the Colombian Government, etc. I suppose you have a copy of these letters and have examined them all?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Was M. Hutin authorized by his company to make these propositions?

M. LAMPRE. Yes, sir.

The CHAIRMAN. And in that form?

M. LAMPRE. Yes, sir.

The CHAIRMAN. The Isthmian Canal Commission, on reducing to a calculation in figures and values all the propositions submitted by M. Hutin in these letters, reported that the purchase of the canal would cost the Government of the United States \$109,000,000.

M. LAMPRE. There is a misunderstanding in that, Senator. We stated that we valued the company's property at that figure, but at the same time we admitted that we were ready to discuss the figures and cut them lower down if it were necessary. It was not a definite offer at \$109,000,000. It was only a statement of what we thought was the value of our property.

The CHAIRMAN. Admiral Walker states that he had been engaged a long time in trying to get a proposition from M. Hutin, and after two years and a half, which I think was the period he stated——

M. LAMPRE. So he does state. I know he does state it.

The CHAIRMAN. He finally succeeded in getting the matter before him, which I think he had no right to ask anything about at all. We did not send him there to get a proposition; we sent him there to find out what the difficulties were and how they could be removed. At all events, though, in this diplomatic attitude or function that he assumed, he opened up the subject and had the great correspondence with the Panama Canal Company. He came to the conclusion that he could not get a definite proposition from the company and notified M. Hutin he was going to close the question on a certain day, and he was bound to do it in order to get his report before Congress, and thereupon M. Hutin, after having conferred with his company and having assembled certain experts, I think he states, made the proposition which is contained in his letter, whatever that amounts to.

M. LAMPRE. Yes, sir.

The CHAIRMAN. Whether it is an offer of sale for a certain sum of money or whether it is the establishment of negotiations to ascertain what sum would be paid?

M. LAMPRE. Negotiation, sir.

The CHAIRMAN. Now that was \$109,000,000.

M. LAMPRE. Yes, sir, to be discussed.

The CHAIRMAN. I know, but we can not figure it below that. Of course your company was hoping that it would bring them \$109,000,000 if we accepted that proposition.

M. LAMPRE. Yes, if it had been accepted it would have brought us \$109,000,000.

The CHAIRMAN. That was the sum of money we were to consider as at least a basis of discussion or arbitration?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Now, if you believed that that property was worth \$109,000,000, and M. Hutin said you believed that, what caused you to drop to \$40,000,000?

M. LAMPRE. The report of the commission valuing our property at \$40,000,000 and the sentiment of the stockholders that we ought to enter into the views of the commission and name that amount instead of naming the superior amount.

The CHAIRMAN. Now then, if we had named \$30,000,000——

M. LAMPRE. Oh, well, that is quite a different subject.

The CHAIRMAN. If we had named \$5,000,000?

M. LAMPRE. No; I do not think you would have got it at that price. I am positively sure you would not.

The CHAIRMAN. Suppose we had named a sum of money that would have returned to the new stockholders 50 per cent of what they paid in?

M. LAMPRE. Nothing would have been done.

The CHAIRMAN. Forty million dollars is the lowest figure you can possibly take?

M. LAMPRE. It is the lowest figure we can possibly accept.

The CHAIRMAN. I am not making any proposition. I would not give 37½ cents for it as an investment.

M. LAMPRE. Forty million dollars is the lowest proposition the board has power to name.

The CHAIRMAN. The board have authorized you to offer that?

M. LAMPRE. No, sir; not I. The board has offered it direct from Paris.

The CHAIRMAN. You are not authorized to offer it?

M. LAMPRE. No, sir.

The CHAIRMAN. Is any person here authorized?

M. LAMPRE. I came as an agent here to ascertain under what form the proposal, whatever it might be, would have to be made, and the proposal has come while I was at sea and been confirmed officially two days ago.

The CHAIRMAN. Have you abandoned the idea of constructing a canal?

M. LAMPRE. I do not know about that, Senator. It all depends upon what may happen. We think it best at the present time to transfer the company's property to the United States, if the United States will have it.

The CHAIRMAN. Can your company say to the French people that this is not an abandonment of the project of that canal?

M. LAMPRE. It is at present, of course.

The CHAIRMAN. It is a proposition to quit and abandon it?

M. LAMPRE. Yes, it is.

The CHAIRMAN. For \$40,000,000?

M. LAMPRE. It is, but I do not think that any lower proposition would have any chance to be agreed to.

The CHAIRMAN. If you are willing to abandon it and quit it and desert the French people who have subscribed money to it——

M. LAMPRE. They are willing to abandon it.

The CHAIRMAN. You have made that statement. Please state to the committee whether you have got any authority for saying that the French people are willing for this.

M. LAMPRE. I have no authority from my board of administration, but the stockholders' meeting has given the board power to deal with the United States upon the line of the commission's report.

The CHAIRMAN. I feel authorized to express this opinion about it, only as a Senator, that unless the French Government will represent

to the Government of the United States that the French people, the stockholders, the persons interested in that canal, are willing for it, and that the French Government is willing for it, and that they will guarantee the Government of the United States against any interruption of the good friendly relations between France and the United States in consequence of this purchase—unless that can be done, I do not think there is a chance to make a step in this direction, and I wish to state my reasons.

We have had since the foundation of our Government, and before, a most natural and decided national affection and regard for the French people, and we do not want to make enemies of them by taking from them something that has cost them so much at such an enormous sacrifice, and out of which the commonalty of France, of course, will not get one cent. We do not want to do that, and thereby lay ourselves liable to the future effects of a bad state of feeling among the people we honor and are fond of.

If we could get the canal for nothing, I would not be willing to take it. I said a while ago that I would not give 37½ cents for it. I do not mean as a piece of property, but I would not buy it all. I would never buy that canal until the Government of France stepped forward and said, "The people of France are willing and anxious that you should have it."

M. LAMPRE. I have nothing to say to such an expression of opinion, nor can I say anything as to any action the French Government may take. I do not know.

The CHAIRMAN. Your mission here, I understand, does not include any idea of the kind I have just been advancing?

M. LAMPRE. No, sir.

The CHAIRMAN. You do not in any respect represent the French Government here?

M. LAMPRE. No, sir.

The CHAIRMAN. But that is a matter in the future. You can understand that if there was any serious opposition to it in the French Chambers, or among the people at all, the Congress of the United States would not interfere; for if your property is worth \$100,000,000 and we take it for \$40,000,000 because you are in a close place and would like to get out of it, we are to that extent robbers; that is all.

M. LAMPRE. I have nothing to say.

The CHAIRMAN. You would not hold that attitude toward this country?

M. LAMPRE. I can not say anything at all as to that. That is an opinion.

The CHAIRMAN. I will excuse you unless there is something else you wish to state.

M. LAMPRE. No, sir; nothing at all.

STATEMENT OF M. JULES BŒUFVÉ.

The CHAIRMAN. Now, M. Bœufvé, I will ask you just one question.

M. BŒUFVÉ. Yes, sir.

The CHAIRMAN. You are chancellor of the French embassy?

M. BŒUFVÉ. Yes, sir.

The CHAIRMAN. And you have presented a cablegram to the Government?

M. BŒUFVÉ. Yes, sir; on Saturday, the 4th of January, 1902.

The CHAIRMAN. You did that as a private gentleman, not as an official of the embassy?

M. BŒUFVÉ. Oh, no; as a private citizen.

The CHAIRMAN. The embassy has no connection with that act whatever?

M. BŒUFVÉ. No, sir.

The CHAIRMAN. And you do not understand that you in any sense at all commit the French Government by having made that communication?

M. BŒUFVÉ. No, sir.

The CHAIRMAN. That is all I wanted to ask you, sir.

M. BŒUFVÉ. Thank you.

The CHAIRMAN. Now, gentlemen, we are through with this examination unless there is some question to be suggested by someone.

Senator FOSTER, of Louisiana. The only question I wish to suggest is to move that we adjourn.

The CHAIRMAN. I do not want the subcommittee to take an adjournment, but it will take a recess. M. Lampre, on looking over his testimony, may wish to make some corrections.

M. LAMPRE. Certainly, if you will be kind enough to let me see it.

The CHAIRMAN. Therefore I will not adjourn the subcommittee, but we will take a recess until Monday morning at 11 o'clock, if M. Lampre can appear here at that time.

M. LAMPRE. Very well.

The subcommittee (at 2 o'clock and 30 minutes p. m.) took a recess until Monday at 11 o'clock a. m.

MONDAY, *January 13, 1902.*

The subcommittee reassembled at 11 o'clock a. m.

Present: Senators Morgan (chairman), Hanna, Millard, Kittredge, and Foster, of Louisiana.

Also M. Edouard Lampre and M. Jules Bœufvé, who had been previously sworn.

ADDITIONAL STATEMENT OF M. EDOUARD LAMPRE.

The CHAIRMAN. M. Lampre, have you any facts that you desire to state to the committee in explanation of anything you have stated?

M. LAMPRE. Nothing more than I have said, except that I expect to be allowed to revise my testimony.

The CHAIRMAN. Of course. I will go over it with you.

M. LAMPRE. Thank you.

The CHAIRMAN. On page 19 of the stenographer's notes of your testimony on Saturday, I notice that you have stated that the stock of the company bears no interest until after the canal is completed.

M. LAMPRE. Yes, sir.

The CHAIRMAN. In that statement do you refer to the new stock or the old stock?

M. LAMPRE. I mean the new.

The CHAIRMAN. How was it with the old stock?

M. LAMPRE. The old stock bore interest during the execution of the work, but that interest has been suspended at the time of the failure of the old company.

The CHAIRMAN. What was the rate of that interest?

M. LAMPRE. Five per cent.

The CHAIRMAN. Was that the stipulation of the stock certificate?

M. LAMPRE. Yes, sir; in the stock certificate, in what you call the charter, the by-laws.

The CHAIRMAN. The stipulation in the stock certificate was that that stock should bear interest from date?

M. LAMPRE. It was.

The CHAIRMAN. From date of subscription?

M. LAMPRE. It was.

The CHAIRMAN. Was there any stipulation there that the interest at any time should cease except by payment?

M. LAMPRE. Oh, no; the interest was running, but it was according to law suspended at the time the old company failed.

The CHAIRMAN. You say "according to law." Was there any act of the French Parliament that stopped the interest on those certificates?

M. LAMPRE. It is the law of France, concerning corporations, that when a company fails the interest is suspended. Moreover, judgment decrees of court have been taken in that particular matter to not affect.

The CHAIRMAN. In whose favor?

M. LAMPRE. Against the stockholders.

The CHAIRMAN. All of them?

M. LAMPRE. Well, those who have submitted the case, but it applies to all of them.

The CHAIRMAN. I understand that there were several hundred——

M. LAMPRE. But it is the law. I must insist on that.

The CHAIRMAN. I understand that there were several hundred thousand stockholders.

M. LAMPRE. I can not state the number of stockholders. I know the number of shares, but the number of stockholders I do not know at all.

The CHAIRMAN. The number of shares you stated?

M. LAMPRE. Six hundred thousand. That is to say, 300,000,000 francs divided in shares of 500 francs, which makes 600,000.

The CHAIRMAN. Now, have all those stockholders been summoned into court?

M. LAMPRE. No, because you know——

The CHAIRMAN. How, then, could a decree pass against them stopping their right to collect interest against this company?

M. LAMPRE. It is the law, Mr. Chairman. I insist on that.

The CHAIRMAN. What law do you refer to—what statute?

M. LAMPRE. I refer to the commercial law concerning failures of corporations.

The CHAIRMAN. Do you state that it is the commercial law of France that whenever a company becomes insolvent and goes into court, or is taken into court, thereupon any contract that it has with its stockholders for the payment of interest is abrogated?

M. LAMPRE. The running of interest ceases at the time of the failure of the company.

The CHAIRMAN. It ceases for how long?

M. LAMPRE. It ceases entirely.

The CHAIRMAN. Entirely?

M. LAMPRE. Entirely.

The CHAIRMAN. Suppose upon the liquidation and settlement of

the company it should turn out that they were not insolvent, but had money to pay the interest, how, then, would the interest be lost to the stockholders?

M. LAMPRE. Any portion of the money left in the treasury of the failing company would have to be divided between the interested parties.

The CHAIRMAN. If it was to be divided it could not have been lost to them? They could not have been barred the right to receive it?

M. LAMPRE. No, sir.

The CHAIRMAN. Then you are in error when you say that taking a case of this sort into court stops the interest.

M. LAMPRE. It does stop the interest. That is another question altogether. The stockholders get only the division of what portion of the money remains after interest being stopped at the time the company fails.

The CHAIRMAN. Why is it not a part of their right in the contract? Why does not the entire contract stop as well as the interest?

M. LAMPRE. It does stop. The company goes into dissolution. This is a very fair law in France. A liquidator is appointed and takes up every interest, as the money, the debts, the cash, and divides, when the time comes, the assets between the different interests, according to their rights.

The CHAIRMAN. I can only say that that is a new idea of law to me. I can not reconcile it to the American ideas of jurisprudence.

M. LAMPRE. I have nothing to say to that, of course. I might be very much embarrassed by American law. The law is law everywhere.

The CHAIRMAN. You are confident about it, and it surprises me very much.

M. LAMPRE. Law is law everywhere, and as such is accepted everywhere.

Senator MILLARD (to the chairman). Do you understand that when this company got into the hands of a receiver, as we would call it, they had foreclosure proceedings?

The CHAIRMAN. I have never ascertained from the witness what the nature of the proceeding was.

Senator MILLARD. I suppose if foreclosure proceedings were had at that time it would practically wipe out the stock. If there was what we call a foreclosure, would it not wipe out the stock?

The CHAIRMAN. Only for the purposes of winding up.

Senator MILLARD. I had supposed that the company had been foreclosed against, and that the property was simply in the hands of a receiver to be settled, so far as the bonded debt was concerned.

M. LAMPRE. That is quite right, sir.

Senator MILLARD. That is, the old company?

The CHAIRMAN. It is the winding up of the old company, I understand, and not a mere foreclosure of the mortgage resting upon this property. At all events the contract between the stockholders of the old company and the new company has not been changed by any decree of a court in France?

M. LAMPRE. No, sir.

The CHAIRMAN. It remains for what it is worth?

Mr. LAMPRE. What it was. I do not know whether I made a statement to this effect. The liquidator of the old company having been appointed by the court, to the effect of carrying out the duties which

the liquidators or receivers of companies are entitled to according to French law, has, moreover, and especially by that same decree, been instructed to transfer, if possible, to a new corporation to be formed all the assets of the old company, so that the work might be resumed, and proceed to accomplishment and completion, if possible. So you see that the transfer made to the New Panama Canal Company has been made as concerns the liquidator under the authority and approbation of the French courts.

The CHAIRMAN. You spoke of the bonds of the old company being outstanding?

M. LAMPRE. Yes, sir.

The CHAIRMAN. I think you stated that there were 800,000,000 francs of them?

M. LAMPRE. About so.

The CHAIRMAN. And that they bear interest at the rate of 5 per cent?

M. LAMPRE. They do; but the interest is suspended, too, according to the same law, from the time of the failure of the company.

The CHAIRMAN. So that if the assets of the old company should turn out to be sufficient to pay the interest after the settlement, those assets, of course, then, would not go to the new company?

M. LAMPRE. No, sir.

The CHAIRMAN. Where would they go?

M. LAMPRE. To the old company.

The CHAIRMAN. How could that be?

M. LAMPRE. I should like to understand the question clearly, please.

The CHAIRMAN. How could that pay off the interest on the bonds?

M. LAMPRE. Please put the question again. I should like to understand it clearly.

The CHAIRMAN. I will try to state it clearly.

M. LAMPRE. Thank you.

The CHAIRMAN. Interest at the rate of 5 per cent was due to the bondholders?

M. LAMPRE. Yes, sir.

The CHAIRMAN. By the terms of their bonds?

M. LAMPRE. Exactly. I beg pardon for a moment. As concerns the bonds, the interest was not due for every kind of bonds at 5 per cent. It varies according to the different issues of bonds.

The CHAIRMAN. There are different rates of interest on different bonds?

M. LAMPRE. Yes.

The CHAIRMAN. So that it was not always 5 per cent?

M. LAMPRE. No.

The CHAIRMAN. When this company failed and went into court—

M. LAMPRE. The old company; yes.

The CHAIRMAN. When the old company failed and went into court, do I understand you to say that the interest on the bonds ceased?

M. LAMPRE. Yes, sir. I should like to be understood thoroughly and to make it clear. That is to say, at that time the bondholders could not claim to have the interest paid by the liquidation on account of the failure; but when the time would have come for division of whatever assets might have been left in the hands of the liquidator, of course, in the account of the amount to be given to each bondholder, they would have also added the interest up to the time of the failure

of the company if not paid. That would be, let us say, an amount of so much money to be divided according to every bondholder's account, under a proportion as to the assets of the old company, pro rata.

The CHAIRMAN. Up to the date of the decree of the court of which you have spoken, both the bondholders and the stockholders of the old company had the right to receive interest, one upon the bonds and the other class upon subscriptions of stock?

M. LAMPRE. Yes, sir.

The CHAIRMAN. You stated in your testimony the other day, if I understood you correctly, that a liquidator had been appointed, and that that liquidator represented these stockholders?

M. LAMPRE. Yes, sir.

The CHAIRMAN. But not the bondholders?

M. LAMPRE. No, sir; at the time he did, but something else has been done since. A special law I have spoken of, the law of July 1, 1893, concerning that very liquidation of the old company, has appointed another man to hold the interests of the bondholders.

The CHAIRMAN (exhibiting the act of July 1, 1893, incorporated in the testimony of M. Lampre on Saturday). Is that the act you refer to?

M. LAMPRE (examining paper). Exactly, Mr. Chairman; the act of July 1, 1893.

The CHAIRMAN. Who was this other bondholder's liquidator?

M. LAMPRE. His name is Mr. Lemarquis.

The CHAIRMAN. Has that liquidator any control over the property of the corporation?

M. LAMPRE. No, sir.

The CHAIRMAN. Was that liquidator appointed by the court or by the selection of the bondholders?

M. LAMPRE. By the court.

The CHAIRMAN. What does he do? What are his functions?

M. LAMPRE. He represents the interests of the bondholders of the old company.

The CHAIRMAN. For what purpose?

M. LAMPRE. For the purpose of having their claims, if any have happened, set to right by the courts, and to exercise in their name the claims the bondholders might have been entitled to. It is rather a complicated machine, Mr. Chairman. It is new altogether.

The CHAIRMAN. I should say it was complicated. It is new in legislation entirely.

M. LAMPRE. There has been new legislation. On account of the immense quantity of interests involved in the liquidation of the old company, the Parliament had thought it would be necessary to have the thing done as it has been done.

The CHAIRMAN. Have you the authority of that liquidator to come here and sell this property?

M. LAMPRE. He has no authority to give that.

The CHAIRMAN. I ask you the question whether you have no authority——

M. LAMPRE. No, I have no authority.

The CHAIRMAN. No authority from him?

M. LAMPRE. No; neither have I, as I stated, any authority from my own company. The offer has been made direct from Paris by the company. I have no authority to make it.

The CHAIRMAN. You say it has been made?

M. LAMPRE. Yes, sir; it has been made.

The CHAIRMAN. When was it made?

M. LAMPRE. I believe it was Friday last—Friday or Thursday.

The CHAIRMAN. In writing?

M. LAMPRE. By cable sent direct. I explained the whole proceeding.

The CHAIRMAN. Have you seen that cable?

M. LAMPRE. I have seen it.

The CHAIRMAN. Have you a copy of it?

M. LAMPRE. I have not a copy with me. It is the cable sent by the company in Paris to Admiral Walker.

The CHAIRMAN. Can you furnish a copy of it?

M. LAMPRE. I have not it. Admiral Walker has it. It is a copy sent from Paris to the president of the Isthmian Canal Commission direct by the company, under the signature of the president of the board.

The CHAIRMAN. Is that cable from the new Panama Canal Company?

M. LAMPRE. Yes, sir.

The CHAIRMAN. From whom else?

M. LAMPRE. That is all, sir, a copy of that cable being at the same time deposited in Paris in the hands of the United States ambassador. Moreover, another copy of what was also at the same time deposited with the United States ambassador is at the present time on its way to Admiral Walker.

The CHAIRMAN. What interest has that liquidator for the bondholders in the property of the new corporation?

M. LAMPRE. The interest concerning the division of profits according to the by-laws—60 per cent to the interest of the old company.

The CHAIRMAN. He has an interest in the property of the new company?

M. LAMPRE. I mean the bondholders have, of course.

The CHAIRMAN. He represents them?

M. LAMPRE. Yes, he represents them.

The CHAIRMAN. He has an interest in the property of the new company?

M. LAMPRE. Upon that line.

The CHAIRMAN. And the liquidator who represents the stockholders has also an interest in the property of the new company?

M. LAMPRE. The same interest.

Senator HANNA. May I ask a question right there? Do you mean the tangible property or the consequent profits that might arise?

M. LAMPRE. I mean the profits only, of course.

Senator HANNA. Not the tangible property?

M. LAMPRE. I mean the profits. The property has been transferred to us direct and outright. I only mean—and I wish to make it very plain—the profits to be derived, in the proportion of 60 per cent.

The CHAIRMAN. Will you explain how, either under French law or any other law, a man can have an interest in the profits of property and not be interested in the tangible property that constitutes the basis?

M. LAMPRE. It is quite a different thing to my opinion. The property has been transferred to the new company under the contract, the agreement, that the consideration, the concession for this transfer should be the amount of 60 per cent of the profits to be derived from the canal, and that is all.

The CHAIRMAN. As we would express the idea here, the new company would hold its property in trust.

M. LAMPRE. It is not the same thing at all.

The CHAIRMAN. I am not asking you what you think. I am telling you what we think about it.

M. LAMPRE. Yes, sir. I have nothing to say about that.

The CHAIRMAN. The new company would hold its property in trust for the performance of these obligations and would be accountable for the profits because it held the property and because it was a trustee?

M. LAMPRE. Yes, sir; but with us the new company is absolutely the owner, the proprietor of the property transferred by the old company, and its only liability to the old company is to give the old company the 60 per cent of the profits derived from the canal.

The CHAIRMAN. That is the whole story? You hold the legal title and are bound to account for the profits?

M. LAMPRE. That is all.

The CHAIRMAN. That is, the usufruct of the property. I understand you to make the point that the new company have taken legal title to all the assets held by the old company?

M. LAMPRE. Quite so; most positively.

The CHAIRMAN. You admit that the new company are bound to use that property for the purpose of earning profits, and when the profits are earned they are bound to divide them with the old stockholders and the old bondholders?

M. LAMPRE. That was the agreement, Mr. Chairman.

The CHAIRMAN. We consider that a very material interest in this country.

Senator HANNA. I wish to ask a question in reference to that matter. Would not that depend entirely upon the nature of the contract? If those profits were not made, would there be any reason why any change in the contract could be made from the fact that no profits accrued? Would that vitiate the contract?

M. LAMPRE. Of course, if no profits were derived from the canal there would be nothing at all to divide.

Senator HANNA. There would be no claim on the material property of the company if it failed to pay profits?

M. LAMPRE. And no settlement to be made at the time. But, in fact, the new company has the sole and absolute ownership and is owner and proprietor of the property transferred by the old company, with the right to do with it anything it pleases.

Senator HANNA. That is what I wanted to get at.

M. LAMPRE. I wish to make my statement as clear as possible. I think I stated on Saturday last that we considered that the new company was entitled to make a perfect and clear transfer to the United States, if they had wished to take the canal from us, without the interference of the liquidator of the old company. But to make the point quite certain and clear, and to discard every discussion possible, we made an agreement with the liquidator of the old company to the effect that he gave, if needed, all and absolute authority to the new company itself to deal direct and treat with the United States Government. Is that clear to you now?

The CHAIRMAN. That is very clear. You did not make any such agreement as that with the liquidator who represents the bondholders?

M. LAMPRE. He has assented to the agreement.

The CHAIRMAN. In what way? In writing?

M. LAMPRE. He does not appear in the agreement itself, but he gave the liquidator the authority to enter into such an agreement.

The CHAIRMAN. Upon what authority do you speak on that point?

M. LAMPRE. The liquidator asserts it in the agreement I am speaking of. I have not seen the authority.

The CHAIRMAN. That the liquidator for the general company and the liquidator for the bondholders had assented to this?

M. LAMPRE. Yes, sir.

The CHAIRMAN. And that is all you know about it?

M. LAMPRE. That is all I know about it.

Senator KITTREDGE. As I understood you last Saturday, the court having jurisdiction of this whole matter authorized the liquidator to do just as he did do?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Which liquidator?

Senator KITTREDGE. The liquidator of the old company, I understand.

M. LAMPRE. Exactly.

The CHAIRMAN. But not the liquidator of the bondholders?

M. LAMPRE. No; I mean Mr. Goutran, the liquidator himself. I do not mean the representative of the bondholders.

The CHAIRMAN. He makes no statement about it?

M. LAMPRE. That is under the law of July 1, 1893.

The CHAIRMAN. You have stated that the new company owns the property of the old company absolutely, with the right to do anything with it that it pleases?

M. LAMPRE. Yes, sir.

The CHAIRMAN. From what source did it get the right to do with it anything that it pleases?

M. LAMPRE. From the agreement embodied in the charter, article 5, and from the fact that the liquidator, being a party himself to the charter, submits, of course, to the charter itself, under the general law of private corporations.

The CHAIRMAN. Could the new company sell that property and put the proceeds in their pockets and not divide it?

M. LAMPRE. Yes, sir; under the authority of the stockholders' meeting.

The CHAIRMAN. It must have been a sale to them, then, free from all possible incumbrance, of the old bonds and the old stock?

M. LAMPRE. Provided that out of the profits they gave 60 per cent to the old company.

The CHAIRMAN. Suppose that they sold the property and put the money in their own pockets?

M. LAMPRE. It would not be fair.

The CHAIRMAN. I admit it would not be fair.

M. LAMPRE. It would not be fair at all.

The CHAIRMAN. You say they can do with it whatever they please?

M. LAMPRE. Yes, sir.

The CHAIRMAN. That is a broad expression, and you are under oath, and you are a lawyer.

M. LAMPRE. Yes; I am under oath.

The CHAIRMAN. How can they do with it whatever they please?

M. LAMPRE. With the authority of the stockholders' meeting. But

I say, moreover, that of course such action would not be fair and honest and never has been dreamed of.

The CHAIRMAN. Is there any possibility, under the French law, that under a contract such as you have described they can perpetrate any kind of unfairness they want upon the old stockholders and the old bondholders and go scot free?

M. LAMPRE. I guess if such a thing had been dreamed of, the liquidator would have applied to court to have things put straight.

The CHAIRMAN. Then you admit the French court would have power to correct the new company and its directors and managers with reference to a matter of that kind and to compel them to account?

M. LAMPRE. Yes, sir; I do admit it, because it would be a thing unfair, against honesty and law.

The CHAIRMAN. That is exactly what I mean. It would be against honesty and law, and that is the reason why I suppose there is such a tribunal in France to execute law and compel honesty.

M. LAMPRE. Yes, sir.

The CHAIRMAN. Now, that being so, the court there would have jurisdiction to compel the new company to appropriate this property to the purposes of that contract or that arrangement?

M. LAMPRE. Yes, sir; a division of the amount to be obtained to be made between the old interest and the new interest, of course.

Senator HANNA. There is a contract, an agreement, which specifies what that shall be?

M. LAMPRE. Mr. Senator, there is now a contract, as I said on Saturday last, to the effect that the amount to be got from the sale of the property is to be divided between the old interest and the new interest, according to the decree of an arbitration court.

Senator HANNA. You stated that there was an agreement for a final disposition of the proceeds of the sale of the property; that it was to go to an arbitration for settlement between the old and the new company?

M. LAMPRE. Yes, sir.

Senator HANNA. In reference to the question as to doing what you please with the property, it is subject, of course, to that agreement for an arbitration?

M. LAMPRE. Exactly.

The CHAIRMAN. The bonded indebtedness of the old company still bears interest, does it not?

M. LAMPRE. No, sir.

The CHAIRMAN. It does not?

M. LAMPRE. No. I explained, I tried to explain, that the interest had been suspended at the time of the failure.

The CHAIRMAN. Has it suspended?

M. LAMPRE. Yes; but of course—

The CHAIRMAN. That is what led me to the question. Suspension is not destruction.

M. LAMPRE. I understand what you mean, and I wish to explain, if possible. It has been suspended. I think I said so in the beginning of this examination. But, of course, the interest that would have run up to the time of the suspension, when the liquidator of the old company would make a distribution between the interests he represents, would be added to the capital itself.

Senator HANNA. As an asset?

M. LAMPRE. As an asset. So that, to make the thing clear by illustration, if a bondholder had a bond amounting to 6,500 francs' capital, the interest, whatever it might be, having run the time of the suspension and failure of the company, supposing it to be 100 francs more, would be added to that stock. That would make it 600, upon which he would get a pro rata.

The CHAIRMAN. Do you think that upon that basis the new company would account to him?

M. LAMPRE. The new company has not to account to him. The new company has only, under the charter, to give to the liquidator 60 per cent of its net profits.

The CHAIRMAN. I mean, account to the liquidator?

M. LAMPRE. That is what I mean, too.

The CHAIRMAN. You would not put it upon that basis?

M. LAMPRE. The liquidator would do it. That is no matter for us. We give him what we owe him, and it is his own business to divide as he chooses, under the court.

The CHAIRMAN. You do not seem to comprehend my question. You say the interest which had accumulated before the company went into bankruptcy would be added to the principal?

M. LAMPRE. I do say it.

The CHAIRMAN. And that both that interest and principal would be represented by the liquidator?

M. LAMPRE. No, sir.

The CHAIRMAN. So the new company in paying the 60 per cent to the liquidator would have paid it upon that basis?

M. LAMPRE. No; I do not say that. The new company would have had out of a hundred francs the only liability to give sixty to the liquidator, and we have nothing to do with it. The liquidator distributes the amount between the bondholders. We have nothing to do with it.

The CHAIRMAN. Then, if the matter ran on, say, twenty-five or thirty or forty or fifty years, the interest would be still accumulating all those years?

M. LAMPRE. Yes, sir. This is no matter of ours. The new company has nothing to do with it.

The CHAIRMAN. And the liquidator would have to divide what he got between the bondholders and stockholders, according to the respective priorities?

M. LAMPRE. Yes, sir.

The CHAIRMAN. Interest added to the capital?

M. LAMPRE. Yes, sir.

The CHAIRMAN. As long as the contract stood?

M. LAMPRE. Yes, sir.

The CHAIRMAN. It will stand until it is paid?

M. LAMPRE. Yes, sir.

The CHAIRMAN. That is all right. I understand it.

M. LAMPRE. But we have nothing to do with it, of course.

The CHAIRMAN. I do not know whether you have or not. I have my own judgment about that.

M. LAMPRE. I answered your question. I expressed my opinion. I can not discuss your opinion. I would not presume to discuss it.

The CHAIRMAN. There is nothing presumptuous about a lawyer expressing an opinion on any proceeding.

M. LAMPRE. I state my opinion of the French law. I have nothing to do with what the American law is.

The CHAIRMAN. I wish to ask one question about the Panama Railroad Company.

M. LAMPRE. I am willing to answer any question I can.

The CHAIRMAN. Do you think you know anything about the operations of that company?

M. LAMPRE. Very few things. I may know something.

The CHAIRMAN. Has the New Panama Canal Company, through its directors, any jurisdiction to control the Panama Railroad Company, the New York corporation?

M. LAMPRE. No, sir.

The CHAIRMAN. None whatever?

M. LAMPRE. None whatever. It is quite an independent corporation. We only own a great amount of the stock, that is all.

The CHAIRMAN. You are stockholders?

M. LAMPRE. We are stockholders.

The CHAIRMAN. When you were before the committee on Saturday last you could not remember the amount of receipts from this railroad corporation that had been put into the hands of the Panama Company?

M. LAMPRE. Oh no, sir; I have no recollection whatever.

The CHAIRMAN. Is it a large amount?

M. LAMPRE. Do you mean at this time?

The CHAIRMAN. No; since you have been secretary of this new company?

M. LAMPRE. Oh, sir, I do not recollect. There has been an amount paid last year as a dividend. I forget what it was. It is only an expression of remembrance. I believe it amounted to about 400,000 francs. I yma be mistaken.

The CHAIRMAN. For the previous year, how much?

M. LAMPRE. Previous to that? I know nothing about that. That was a dividend distributed last year, and I do think, but I can only express an opinion on the matter, that it amounted to about that dividend on the stock we own.

The CHAIRMAN. I notice here that in Poor's Manual, supposed to be, and intended to be, a manual that gives the history of the conditions of all the railroads——

M. LAMPRE. I do not know the book.

The CHAIRMAN. It is the Manual of 1900. Have you ever examined the book?

M. LAMPRE. No; I do not know it at all. It is the first time I ever heard of it.

The CHAIRMAN. I suppose that your company has received from this railroad company all that is due in the way of dividends upon stock?

M. LAMPRE. Oh, yes, sir. That was, in fact, the only dividend we got from the Panama Railroad. I mean the new company, of course.

The CHAIRMAN. I notice that the earnings, as stated here, from passengers were \$63,646.47; from freight, \$954,037.31; from mail and treasure, \$68,800.58; from miscellaneous sources, \$345,997.52; and from steamship, \$762,470.08. Does the New Panama Canal Company own any steamship line?

M. LAMPRE. No, sir.

The CHAIRMAN. Is it interested in any that you know of?

M. LAMPRE. No, sir. The Panama Railroad Company owns a steamship line, but that is the property of the Panama road, not ours.

The CHAIRMAN. The Panama Railroad owns a steamship line?

M. LAMPRE. It owns a steamship line on the Atlantic.

The CHAIRMAN. Between what points does it run?

M. LAMPRE. It runs from New York to Colon.

The CHAIRMAN. And then on the other side?

M. LAMPRE. On the other side I believe they have agreements with the Navigation Company to conduct the operations in connection with the railroad line.

The CHAIRMAN. It owns a line, then, from New York to Colon?

M. LAMPRE. Yes, sir; from New York to Colon, on the Atlantic.

The CHAIRMAN. This item here, earnings from steamship, \$762,470.08, refers to that line?

M. LAMPRE. I do not know, sir.

The CHAIRMAN. You do not know?

M. LAMPRE. I do not know at all. I must decline, of course, to answer questions concerning the railroad. Of course it is not my business here.

The CHAIRMAN. The whole receipts are stated at \$2,195,041.96. Do you know——

M. LAMPRE. I know nothing about that. I must decline to answer any question concerning the railroad.

The CHAIRMAN. The net earnings are stated at 35.34 per cent, \$775,646.77.

M. LAMPRE. Again, I have nothing to say to that.

The CHAIRMAN. Now, if you got from that company your proper percentage, according to your stock, of that \$775,646.77, about what part of it would you receive in money?

M. LAMPRE. I do not know. I have nothing to say.

The CHAIRMAN. You stated the amount of stock that you possess?

M. LAMPRE. Oh, yes; we own 68,534 shares.

The CHAIRMAN. You stated that there are 70,000 shares?

M. LAMPRE. Seventy thousand.

The CHAIRMAN. And with 68,534 shares, in that proportion you draw the dividends?

M. LAMPRE. No, sir; I would not say that, because it is a matter of calculation. I can not answer these questions.

The CHAIRMAN. Whatever proportion of the stock that your company owns bears to 70,000——

M. LAMPRE. We have 68,534 shares.

The CHAIRMAN. In that proportion you draw the net earnings of this railroad company?

M. LAMPRE. We get dividends on that stock, of course; whenever one is distributed. There has been only one distributed since the existence of the new company. That was last year and to the amount approximately stated.

The CHAIRMAN. So if the net earnings for the last year were 35.34 per cent on the whole stock of 70,000 shares, then you would get 35.34 per cent upon the stock that you own?

M. LAMPRE. I do not know what the percentage is. We would get the dividend on 68,534 shares. The calculation can be made, but I can not make it straight out now, without figuring it, of course.

The CHAIRMAN. Do you not now know that your company has received these dividends?

M. LAMPRE. I know that the company has received dividends

amounting to about 400,000 francs, to my approximate recollection, and I would not dare to say anything more.

The CHAIRMAN. I am not after particulars; I am after the general facts. I will put into the record the entire table here, on pages 845 and 846 of Poor's Manual, to show the situation of the Panama Canal Company. If you wish to examine it and point out any misstatement in it, you can do so.

M. LAMPRE. I only wish to answer your questions. That is all I am here for.

The CHAIRMAN. You do not wish to examine this table and point out any misstatement that may be in it, if there is any?

M. LAMPRE. No, sir.

The CHAIRMAN. Assuming, on my part, that the statement is correct, and we all rely on these statements here in the United States, I will have it inserted.

M. LAMPRE. I am sworn here, and I have been here on examination three hours last Saturday trying to explain clearly and frankly and sincerely everything that was asked me.

The CHAIRMAN. That is right.

M. LAMPRE. I hope I have succeeded.

The CHAIRMAN. I hope so.

M. LAMPRE. I would not like to be put here in the position of a culprit, of course.

The CHAIRMAN. We are not here for the purpose of passing compliments, but to get at the truth.

M. LAMPRE. This is what I want.

The article referred to is as follows:

PANAMA RAILROAD COMPANY.

Main line of road:

Colon (Atlantic) to Panama (Pacific), Colombia, 47.5 miles.

La Boca Branch, Junction to La Boca, 2.5 miles—50 miles.

Sidings, 12.23 miles. Gauge, 5 feet. Rail (steel), 56 and 70 pounds.

History.—This interoceanic line was chartered by the legislature of New York April 7, 1849. The road was opened from the Atlantic to the Pacific January 28, 1855. The immediate purpose was to provide a route to California. It has become a great commercial highway between the nations on the coasts of western Europe and eastern Asia as well as between San Francisco and New York. The concessions from the United States of Colombia were granted in 1850, and, as amended and enlarged, run until the year 1966. They have continued for forty-eight years unimpeached and unquestioned, and represent a large cash investment, fully discharged, leaving payable only the annual subsidy of \$250,000. By its concessions the company is exempted from payment of any tax.

Rolling stock, December 31, 1899.—Locomotives, 35. Cars—passenger (special, 5; first class, 8; composite, first and second classes, 2; second class, 9; baggage, 7), 31; freight (box, 589; coal, 136; flat, 188), 913; miscellaneous, 57; total cars, 1,001.

Floating stock.—Consists of the steamers *Advance*, *Finance*, and *Allianca*, comprising the Panama Railroad Steamship Line between New York and Colon, which makes connection at Panama for all points on the west coast of North, Central, and South America; also 3 steam tugs, 18 freight lighters, 6 coal lighters, and 1 floating pile driver.

Operations, year ending December 31, 1899.—See tabulated statement below:

Earnings:

Passenger.....	\$63,646.47
Freight.....	954,037.31
Mail and treasure.....	68,890.58
Miscellaneous.....	345,997.52
Steamship.....	762,470.08
Total.....	2,195,041.96

Expenses:

Operating expenses of railroad.....	\$487,741.19
Joint railroad and steamship expenses.....	289,911.81
Steamship.....	641,742.19
Total.....	1,419,395.19

Net earnings (35.34 per cent), \$775,646.77. Payments: Interest on subsidy bonds, \$96,660; redemption of subsidy bonds, \$128,340; subsidy to Republic of Colombia, \$25,000; interest on first-mortgage bonds, \$80,415; redemption of first-mortgage bonds, \$150,000. Total, \$480,415. Surplus, \$295,231.77.

Abstract of operations, earnings, etc., for ten years.

	1890.	1891.	1892.	1893.	1894.
Passengers carried.....	64,652	56,276	49,446	42,018	44,805
Freight moved (tons).....	231,523	224,560	215,905	200,082	216,676
Gross earnings.....	\$1,949,817	\$1,937,002	\$1,768,744	\$1,414,127	\$1,363,356
Operating expenses.....	1,037,950	974,768	948,354	916,762	953,393
Net earnings.....	911,867	962,233	820,390	497,365	400,963
Interest paid.....	351,993	347,433	342,573	367,158	368,739
Dividends paid.....	350,000	350,000	140,000	140,000	.....

	1895.	1896.	1897.	1898.	1899.
Passengers carried.....	63,089	103,757	109,924	117,804	72,232
Freight moved (tons).....	271,063	279,197	290,651	268,156	287,400
Gross earnings.....	\$1,706,441	\$2,271,142	\$2,300,705	\$2,142,881	\$2,195,042
Operating expenses.....	1,153,578	1,235,838	1,406,233	1,390,893	1,419,395
Net earnings.....	552,863	1,035,304	894,472	751,988	775,647
Interest paid.....	362,919	356,799	320,630	189,161	177,075
Dividends paid.....	.....	.....	.....	.....	.....

Profit and loss account, year ending December 31, 1899.—Balance January 1, 1899, \$2,971,448.51; surplus for year (see preceding account), \$295,231.77; $\frac{1}{2}$ per cent 20-year sinking fund gold bonds redeemed, \$140,000—total, \$3,406,680.28. Contra: Cost of two locomotives dismantled during year, less value of parts fit for use, \$10,182.10; adjustment of accounts of previous years, \$5,975.39; uncollectable accounts written off, \$123.85; balance, as per general balance sheet, December 31, 1899, \$3,390,398.94—total, \$3,406,680.28.

General balance sheet, December 31, 1899.

Cost of road, real estate, and equipments.....	\$9,774,951.74
New terminal at La Boca.....	1,386,315.91
La Boca branch, electric-light plant, office buildings, etc.....	92,367.78
Floating equipment.....	708,998.80
Bonds in treasury:	
247 $\frac{6}{10}$ per cent Panama R. R. Co. sinking fund sub-	
sidy bonds.....	\$247,000.00
939 $\frac{4}{10}$ per cent 20-year gold sinking fund bonds....	939,980.00
	1,186,980.00

On deposit with financial agents for redemption of bonds:

6 per cent subsidy bonds.....	\$12,000.00	
4½ per cent gold sinking fund bonds.....	1,263.83	
		\$13,263.83
Advance of subsidy to Republic of Colombia.....		1,482,000.00
Cash in banks and with agents.....		888,006.14
Coal and supplies on hand.....		161,275.74
Due from connecting companies.....		95,740.49
Due from United States Government.....		16,421.60
Due from companies and individuals.....		144,080.81
Accrued interest on deposits.....		6,386.67
Accrued interest on securities owned.....		2,738.75
General average accounts.....		14,671.99
Unadjusted accounts.....		55,100.95
		<hr/>
Total assets.....		16,032,301.20
		<hr/>
Capital stock (\$100 shares).....		7,000,000.00
4½ per cent 20-year sinking fund gold bonds (authorized issue, \$4,000,000):		
Issued to date.....	\$2,821,000.00	
Less redeemed and canceled.....	140,000.00	
		<hr/>
		2,681,000.00
6 per cent gold sinking-fund subsidy bonds ^a		1,482,000.00
Due contractors, new terminal at La Boca ^b		1,179,924.96
Bonds drawn for redemption not presented for payment:		
4½ per cent 20-year gold bonds.....	\$1,072.50	
6 per cent subsidy bonds.....	13,000.00	
		<hr/>
		14,072.50
Accrued interest on bonds.....		34,653.75
Funds for redemption of bonds.....		132,486.33
Due Republic of Colombia:		
Department of Panama.....	\$21,875.00	
Government of Colombia.....	1,666.67	
		<hr/>
		23,541.67
Fund for replacement of boilers and special repairs to tugs.....		9,000.00
Isthmus drafts not presented.....		21,963.38
Coupons not presented.....		3,235.00
Audited vouchers.....		57,428.50
Unclaimed dividends.....		307.00
Due deceased or missing employees.....		2,289.17
Balance to credit of profit and loss.....		3,390,398.94
		<hr/>
Total liabilities.....		16,032,301.20

To meet this bonded indebtedness \$225,000 annually of the Colombian Government subsidy was pledged till March 27, 1908, the same to be applied by the company: First, to the payment of the interest, and second, as a cumulative sinking fund for the redemption of the principal; the bonds to be drawn yearly in September to an amount equal to the then surplus of the subsidy sinking fund, the drawn bonds to be paid on November 1, after each drawing, and thereby redeeming the whole issue in 1908.

The first-mortgage 4½ per cent gold sinking-fund bonds are dated August 15, 1897; due October 1, 1917; interest April 1 and October 1, at the office or agency of the company in New York, N. Y. The authorized amount is \$4,000,000, of which \$2,000,000 were issued and

^a One thousand four hundred and eighty-two 6 per cent gold sinking-fund subsidy bonds of \$1,000 each, amounting to \$1,482,000, issued November 1, 1880, fall due November 1, 1910.

^b Of this amount \$916,000 will become due in 1902, and is secured by an equivalent amount of the company's new 4½ per cent bonds as collateral; \$113,792.98 becomes due March 13, 1900; \$22,824.90 on June 30, 1900, and \$127,307.08 on December 31, 1900. The total may be reduced in the meantime at the option of the company by payments on account.

delivered to the company at the time of the execution of the mortgage, and were issued to retire (together with cash assets of the company) 2,681 sterling mortgage bonds of £200 each which matured October 10, 1897, and which remained in the hands of the public, out of the original issue of 5,000 bonds. The remaining \$2,000,000 were reserved to be issued only for the purpose of the acquisition or construction of property, steamers, vessels, wharves, harbors, piers, railroads, branches, warehouses, grain or other elevators, lands, double tracking, terminal facilities and other property, and for betterments and improvements of the corporate property, and only in such amounts as the board of directors may, from time to time, by a three-fourths vote of the entire board, determine to be necessary for any of said purposes.

The bonds include a provision that in the event that any canal or water connection, connecting the waters of the Atlantic and Pacific oceans, shall be, during the life of the bonds, constructed and actually opened to commerce and the passage through the same of ocean-going vessels from ocean to ocean, then and upon the expiration of four months thereafter, and upon written notice to the railroad company and the trustees of an election in writing to that effect by the holders of a majority in amount of all the said bonds then outstanding, the entire principal sum of said bonds then outstanding shall forthwith become due and payable, anything in the said bonds or mortgage to the contrary notwithstanding. The bonds are redeemable at the option of the railroad company on any interest date after five years from their date, at 105 per cent and accrued interest, in the manner and upon the notice provided in the mortgage securing the same.

The provisions of the sinking fund are to the effect that the company shall apply the sum of \$150,000 in gold each year to the purchase of such bonds in the market at a price not exceeding the principal and a premium of 5 per cent upon the par value thereof and the accrued interest, or to the drawing of such bonds annually by lot at the principal and a premium of 5 per cent upon the par value thereof and the accrued interest. A further issue of \$962,000 of these bonds was authorized in order to provide as may be necessary for contract payments at maturity in 1902, or earlier, at the company's option, on account of indebtedness incurred in the construction of the La Boca terminal. Trustees: Central Trust Company, New York, and William Nelson Cromwell, New York, N. Y.

Directors (elected April 2, 1900): Edward A. Drake, Xavier Boyard, Samuel M. Felton, J. Edward Simmons, William B. Franklin, J. H. Parker, William Nelson Cromwell, Vernon H. Brown, Charles Einsiedler, George Whaley, Robert M. Gallaway, A. Lawrence Hopkins, C. B. Comstock, New York, N. Y.

J. Edward Simmons, president, New York, N. Y.

George Whaley, first vice-president, Paris, France.

Edward A. Drake, second vice-president and secretary, New York, N. Y.

Auditor, John Adams, New York, N. Y.

Treasurer, Sylvester Deming, New York, N. Y.

General manager, Charles Paine, New York, N. Y.

Principal and transfer office, 24 State street, New York, N. Y.

(Poor's Manual of Railroads, 1900, pp. 845, 846.)

The subcommittee (at 11 o'clock and 45 minutes a. m.) adjourned.

WASHINGTON, D. C., *January 14, 1902.*

The committee met at 2 o'clock p. m.

Present: Senators Morgan (chairman), Hanna, Pritchard, Mitchell, Millard, Kittredge, Harris, Turner, and Foster, of Louisiana.

ADDITIONAL STATEMENT OF M. EDOUARD LAMPRE.

M. LAMPRE. I have something to say with respect to one of my answers. There is a mistake, or a misunderstanding.

The CHAIRMAN. Have you corrected it to suit yourself?

M. LAMPRE. I should like to have it altered, if possible. This is the statement to which I refer:

The CHAIRMAN. When the old company failed and went into court, do I understand you to say that the interest on the bonds ceased?

M. LAMPRE. Yes, sir. I should like to be understood thoroughly and to make it clear. That is to say, at that time the bondholders could not claim to have the interest paid by the liquidation on account of the failure; but when the time would have come for division of whatever assets might have been left in the hands of the liquidator, of course in the account of the amount to be given to each bondholder they would have also added the interest from the time of the failure of the company.

That is a mistake. It should be:

Up to the time of the failure of the company, if not paid.

That is on page 69.

The CHAIRMAN. Are there any other corrections which you wish to make?

M. LAMPRE. I have not gone through my testimony.

The CHAIRMAN. I will ask you a question.

M. LAMPRE. Certainly.

The CHAIRMAN. In your testimony you stated that a dispatch was sent by the Panama Canal Company to Admiral Walker.

M. LAMPRE. Yes, sir.

The CHAIRMAN. You stated that as a fact within your knowledge?

M. LAMPRE. Yes, sir. Moreover, you asked me whether I had a copy of it.

The CHAIRMAN. Yes.

M. LAMPRE. I can furnish you a copy of the cable which I myself sent.

The CHAIRMAN. We already have the substance of it in your testimony.

M. LAMPRE. But they acted upon my cable. I can state positively that the cable they sent to Admiral Walker is in the same wording that I suggested. If that will be of any benefit to the committee, I am ready to give it.

The CHAIRMAN. You have given the substance of the cable which you sent? You put it in quotation marks?

M. LAMPRE. Yes, sir; but I have a copy of it here with me.

The CHAIRMAN. Let us have it, please.

M. LAMPRE. It is in French. If it pleases the committee I will translate it.

The CHAIRMAN. We will take it in French.

A copy of the cablegram is as follows:

“La compagnie nouvelle du canal de Panama déclare qu'elle est prête à accepter pour la totalité sans exception de ses bicus et droits

dans l'isthme la somme de quarante millions de dollars. Cette offre est valable jusqu' au 4 Mars 1903."

The CHAIRMAN. That is the dispatch which you sent?

M. LAMPRE. Yes, sir. I may say that the cable sent Admiral Walker was in the same wording as mine.

The CHAIRMAN. In the same words?

M. LAMPRE. In the same words. It is positively correct.

M. Lampre having translated the copy of the cable——

The CHAIRMAN. Here is the translation made by M. Lampre of his cablegram:

"The New Panama Canal Company declares that it is ready to accept for the whole, without exception, of its property and rights on the Isthmus, the amount of forty million dollars, the above offer holding good until March 4, 1903."

Senator MITCHELL. M. Lampre stated the other day very positively, as I understood, that his company had authority from the Colombian Government to make the sale.

M. LAMPRE. Yes, sir; through the Colombian minister here.

Senator MITCHELL. That is what you stated.

M. LAMPRE. Yes, sir.

Senator MITCHELL. I should like, if it is not out of order, to have the question asked him right here and now upon what he bases that statement, whether it is the letter to which the chairman has referred?

M. LAMPRE. I think I understand the question. It is upon the letter.

Senator MITCHELL. It is based upon the letter addressed to Mr. Hutin?

M. LAMPRE. Yes, sir.

The CHAIRMAN. And upon nothing else?

M. LAMPRE. And upon nothing else. I said so yesterday, also.

The CHAIRMAN. Then we have it in the report.

M. LAMPRE. Am I at liberty to go?

The CHAIRMAN. Yes, sir.

The hearing was thereupon closed.

STATEMENT
OF
HON. SAMUEL PASCO
BEFORE THE
SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,
UNITED STATES SENATE,
CONSISTING OF
SENATORS FOSTER, OF LOUISIANA (CHAIRMAN), MITCHELL, PRITCHARD,
KITREDGE, TURNER, AND MORGAN (EX OFFICIO).

ISTHMIAN CANAL.

WASHINGTON, D. C., *Tuesday, February 11, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Foster, of Louisiana (chairman), Mitchell, Pritchard, Kittredge, and Morgan.

Hon. SAMUEL PASCO appeared and was duly sworn by the chairman.

STATEMENT OF HON. SAMUEL PASCO.

The CHAIRMAN. This is a subcommittee which has been appointed by the general committee to look into and investigate the law bearing upon the subject of the transfer of the Panama Canal to this Government, or any other legal questions which may bear upon either one of these routes. As a member of the Commission, will you please state in a general way what consideration your Commission has given to the law bearing specially upon the transfer from the Panama company to the United States, and the law generally bearing upon these two routes, from an international standpoint and from the standpoint of the Colombian Government, the French Government, and the rights of the parties under the charter granted to them—the rights of the Panama company under the charter granted to them in France.

Mr. PASCO. The old Panama Canal Company was organized under the general incorporation laws of France.

It obtained a concession from the Republic of Colombia, what is usually called the Wyse concession, to construct a canal through Colombian territory between the Atlantic and Pacific oceans. This is included among the appendixes to our report. That concession permitted it to transfer its privileges at any time to other parties, but not to any foreign government.

When the canal company entered upon this territory it found itself embarrassed by the charter of the Panama Railroad Company, and the canal company purchased a large majority of the stock of the railroad company.

This railroad company had exclusive privileges there, and no canal could be constructed along the line of its track, and if constructed in any other part of that section of the Panama country it had to be with the consent of the railroad company. So the easiest way of making the arrangement was to purchase a majority of the stock; and the canal company did this, and held it up to the time of the failure of the company.

The company continued its operations for some years, and then failed. The company was then taken into court and a dissolution was declared, and its affairs were placed in the hands of a receiver. There

were some changes in the receivership from time to time, owing to deaths and resignations, but the receiver had the entire charge of the affairs of the company.

Owing to some difficulties in the general law, there was a special law passed, a copy of which this committee has, enlarging the jurisdiction of the courts and settling the question as to where the jurisdiction really existed. The receiver took the entire charge of the affairs of the company, and got an extension of the concession from the Colombian Government, with the understanding that a new company was to be formed, and finally a new company was formed, the company now called the New Panama Canal Company.

All the property of the old company was transferred to this new company. According to the language of its charter, it was "contributed" by the receiver, with the approval of the court. In that way the new company became possessed of the rights and privileges of the old company, and the unfinished work and the railroad shares were to be held for its benefit.

The Colombian Government recognized this transfer by extending the charter or the concessions, first, to the receiver, and afterwards to the new company; and from the time of the transfer the new Panama Canal Company has held all of the property rights and privileges of the old company.

Now, when we first discussed this question of the sale of the rights and property of the New Panama Canal Company to the United States it was proposed to give a title simply from the new company; but I was chairman of the committee on rights, privileges, and franchises, and as such took a leading part in the consideration of the legal questions that arose, and our committee insisted that in order to give a satisfactory title the purchaser must get it not only from the new company but from the liquidator or receiver of the old company, and the representatives of the canal company finally agreed with us that if the title was to be made it must be made in that way.

The position that we took, and the line of action which is proposed now is, for the receiver to get the consent of the court to transfer the property, and when the contract is made by the new company the liquidator or receiver must join in giving the title, and his action must be confirmed and approved by the court under whose authority he is acting. If that is approved by Colombia we think that a good title can be given.

Nothing can be done, of course, without the consent of Colombia, and it is not possible for the French company to deal with the United States under that clause which I referred to in its concession without the approval of the Colombian Government and without a waiver of that prohibition which would prevent it from transferring its interest to a foreign government. That prohibition has, however, been waived, and I understand that no obstacle exists now in the way of making a treaty with the United States Government for the arrangement and settlement of the terms upon which the United States can occupy its territory for the construction and operation of a canal. Of course nothing can be done without that. The final power rests in the Colombian Government.

That, perhaps, in a general way states the situation, and if there is any part of it that can be developed more fully, I will very readily respond to any questions that may be asked.

The CHAIRMAN. What action, if any, is necessary on the part of the Colombian Government or the French Government to secure to this Government the perpetual control, management, and ownership of this Panama route?

Mr. PASCO. I do not understand that the French Government has anything to do with the matter. It is a private corporation, and it is organized under the general laws of France. The interest that the liquidator has in it is controlled by the court having jurisdiction of the matter, but the property lies in Colombia, and of course no transfer of title can be made except in accordance with the laws of Colombia and in accordance with the authority of the Colombian Government; and the concession, as I said, would make it impossible for the French company to transfer its rights without the consent of the Colombian Government. The United States can never go there at all unless the terms by which it can occupy the country and construct and carry on the canal after it is completed can be arranged with the Colombian Government. It can never be done without the consent of Colombia, and that, of course, is a matter for treaty arrangements.

The CHAIRMAN. What steps have been taken to your knowledge on the part of the Colombian Government to agree to this transfer on the part of the Panama Canal Company to the United States?

Mr. PASCO. There was a correspondence some time during the past year, authorizing the Panama Canal Company to confer with the Commission with reference to its price; and there was a waiver of the prohibition in order that that might be accomplished.

The CHAIRMAN. By whom was this waiver made?

Mr. PASCO. It was made by the Colombian Government. It was announced through Mr. Silva, who, I understood, was sent over to this country for the purpose of assisting in carrying out the agreement.

The CHAIRMAN. Was this a formal waiver on the part of the Government through its legislative or executive channels?

Mr. PASCO. I have never seen Mr. Silva's credentials; but he undertook to act with authority.

The CHAIRMAN. When you speak of "you" do you mean yourself personally or the Commission? Are you speaking of the Commission when you say you have never investigated the authority for this waiver?

Mr. PASCO. It has never been laid before any meeting of the Commission.

The CHAIRMAN. The Panama Canal Company has secured an extension of its lease privileges?

Mr. PASCO. Up to 1910. The opinion of the Commission, announced in its report, is that the present concessions to the French company would not suit the United States at all.

The CHAIRMAN. I was going to ask you about that. What do you mean by that statement in your report that the present concessions will scarcely suit the United States?

Mr. PASCO. The concessions are for a term of years, and the Commission recommended that they would be perpetual in their nature. We did not think that after the money of the people of the United States is invested in a canal it should be surrendered after a term of years, no matter how long. We think the United States will need it just as much one hundred or two hundred years from now as to-day.

The CHAIRMAN. Under this concession to the Panama Canal Company there is no perpetual right given to the company?

Mr. PASCO. No, sir; ninety-nine years.

The CHAIRMAN. Now, is it not a fact that in order for this Government to secure the perpetual control, management, and ownership of that route a new concession on the part of the Colombian Government must be secured?

Mr. PASCO. A new concession must be made.

The CHAIRMAN. That is absolutely necessary?

Mr. PASCO. Yes; that is a new concession in the form of a treaty.

Senator MITCHELL. Can the Colombian Government do that under the present situation?

The CHAIRMAN. That was the very question I was going to ask. I am glad you asked it, Senator.

Mr. PASCO. They claim it can. I think it can be done. I do not think the country can be ceded, but I think it can be accomplished.

The CHAIRMAN. How do you think that can be accomplished under the Colombian constitution?

Mr. PASCO. By recognizing the sovereignty of the Colombian Government. It would be like carrying on any other enterprise in the country.

Senator KITTREDGE. That would be in the nature of a perpetual lease.

Mr. PASCO. In the nature of a perpetual lease; yes. It could be done in that way, or as a perpetual grant, as to a corporation.

The CHAIRMAN. What was the idea and what is the idea of your Commission, if this Government should determine to adopt the Panama route, as to the concessions that must be made to this Government before they can proceed to the construction of the canal?

Mr. PASCO. Our view with regard to that matter is the same both with reference to Nicaragua and Costa Rica on the one side and Colombia on the other. The consent of the Government must be given, and if the United States constructs the canal the consent that is given must be perpetual, in whatever shape it is given. And that must all be arranged by a treaty with the Republic with which we are to deal.

The CHAIRMAN. What steps, if any, have been taken on the part of the Commission or on the part of the Panama company to secure these concessions for this Government?

Mr. PASCO. Well, all that matter must be arranged through the State Department. The Commission was not given the authority to deal with those Governments at all.

The CHAIRMAN. Of course, I do not expect you to answer anything as to the work of the State Department; but just as a matter of fact, do you know, or does the Commission know, of any steps having been taken, either by the State Department or by the Colombian Government or by the Panama Company, to secure these concessions from the Colombian Government in order to carry out this transfer?

Mr. PASCO. I only understand in a general way that the State Department is attempting to make some arrangements with the Colombian Government. I understand that recently one or more deputies, if that is the proper title for them, have come on from the department of Panama to assist Mr. Silva in some negotiations.

Senator MORGAN. From the department of Panama?

Mr. PASCO. From the department of Panama.

Senator MORGAN. Authorized by that department?

Mr. PASCO. Yes; because they are recognized as having special rights in any public work of that character extended through the department.

Senator MORGAN. These men do not come from the Government of Colombia, but from the department of Panama.

Mr. PASCO. I understand they come here as advisers for Mr. Silva. They come from the department of Panama. That is my understanding.

Senator MORGAN. The department of Panama is a State of the Colombian Government.

Mr. PASCO. Yes; a department. They have abolished States and now have departments. It is a mere difference in name, of course.

Senator MORGAN. As I understand you, they have come on to advise Mr. Silva.

Mr. PASCO. That is my understanding.

The CHAIRMAN. Then, if this Government should adopt the Panama route, it is necessary practically for the Colombian Government to do away entirely with the Panama Company and enter into new negotiations with this Government upon different terms and conditions.

Mr. PASCO. Altogether; yes, sir.

The CHAIRMAN. And up to the present time you do not know what steps have been taken on the part of the Commission or the Department of State to accomplish that end?

Mr. PASCO. No, sir. The right of occupying the territory of a foreign Government, no matter whether it is Colombia or Nicaragua, must be obtained by treaty arrangement, and that arrangement is with the treaty-making power. It is for the treaty-making power to undertake.

The CHAIRMAN. In your judgment, or that of the Commission, is the French Government called upon in any way to ratify this sale of the Panama Canal?

Mr. PASCO. Not at all; the company is organized under the laws of France, and the old company's affairs are now in the hands of one of the French courts.

Senator PRITCHARD. What disposition was made of the affairs of the old company in the French courts?

Mr. PASCO. They are still pending in proceedings before the French courts.

Senator PRITCHARD. Is the case still being held there for orders?

Mr. PASCO. Yes.

Senator PRITCHARD. There has been no final order in the case?

Mr. PASCO. No final order.

The CHAIRMAN. Under the concession of the Colombian Government to the Panama Company were not special privileges accorded to French shipping interests?

Mr. PASCO. My understanding is—I do not remember that there were any special privileges given to them. The concession is here. It can be examined.

The CHAIRMAN. I will ask you, Senator Morgan, were not special privileges given to the French Government or to French shipping interests?

Senator MORGAN. The privileges were universal, but they may not be such as we would like.

Mr. PASCO. The United States has greater privileges, under the treaty of 1846, than any other Government has; but if they were special privileges to be protected in behalf of the French Government or any other Government, it would be the duty of the Republic of Colombia to protect them in whatever future treaty it might make with the

United States. It would not be a matter for the canal company to arrange, but it would be a matter for the Colombian Government to see to. She would have to protect her own treaty obligations.

Senator KITTREDGE. Is it not a fact that the Republic of France, about the time the work on the Panama Canal was begun, disclaimed any interest as a Republic in that work?

Mr. PASCO. That is my recollection.

Senator MORGAN. In what paper? I should like to see that.

Senator KITTREDGE. Was not that in answer to a request made to the French Republic to declare her intentions on that subject?

Mr. PASCO. I can not put my hand on any paper stating that, but that has been my understanding always with reference to the attitude of the French Government.

Senator MORGAN. You speak of an understanding, Mr. Pasco. Have you ever read any papers that said so?

Mr. PASCO. Well, General, I have read so much relating to this subject during the years I have been on the Commission that I can not at once put my fingers on a particular thing.

Senator MORGAN. You do not remember ever to have read any such papers?

Mr. PASCO. I know that I have that impression with reference to it, but where I got it I can not at this moment tell you.

Senator MORGAN. You can not state?

Mr. PASCO. No, sir; but my idea with reference to any interest the French Government may have there is that it is the duty of Colombia to protect it and that Colombia undoubtedly would protect it in any treaty arrangement it might make with the United States.

The CHAIRMAN. The old Panama Company went into liquidation and a receiver was appointed, and, as I understand, under authority of a judgment of court, the property of the old company, including all of its privileges, was sold to the new company, the consideration of the sale being 60 per cent of the net profits of the canal.

Mr. PASCO. The term that is used is that it was "contributed" to the new company. It was transferred in that way.

The CHAIRMAN. The obligation of the new company was to build the canal and to operate the canal. Now, this company proposes to sell to this Government all of the rights, privileges, and property which it acquired from the old company for \$40,000,000. In the purchase of these rights, of this property, will not this Government assume all the obligations of the new company to the old company?

Mr. PASCO. No; they must be settled in the process of this transaction.

The CHAIRMAN. How would they be settled?

Mr. PASCO. They will be settled through the receiver, the receiver joining in the transaction, becoming a party to the sale, and receiving the proceeds of whatever interest he has as a representative of the creditors and the stockholders of the old company. These proceeds will have, as I have stated, to take the place of the property itself and will be distributed under the order of the court, just as in case of a legal sale in this country where there are a number of different liens and obligations against a piece of property, judgments perhaps, and mortgages and liens of different characters, general creditors, and owners. The property is sold, the proceeds are paid into court, and then the proceeds are distributed under the order of the court. Then all of the old claimants are eliminated. Settlement

with them is made by the court. This is a kindred proceeding to that, according to my understanding.

The CHAIRMAN. The liquidator of the old company of course represents the stockholders and the creditors, and in agreeing to this sale of course he is changing the whole nature and character of the contract which the new company originally assumed in the purchase?

Mr. PASCO. Yes.

The CHAIRMAN. Now, can the liquidator, regardless of the rights of the stockholders and creditors, enter into a contract with this Government or any other party, by which the whole nature of the original contract is changed, and relieve the Government or the purchasing party of the obligations which the new company assumes toward the old company?

Mr. PASCO. I do not think he can of his own volition. I think he can submit the whole matter to the court under whose jurisdiction he is serving and acting.

Senator MITCHELL. At the time this original transfer was authorized by the liquidator—I mean the sale of the property of the old company to the new canal company—there was nothing in that transaction, was there, either directly or indirectly, which contemplated a sale of this property to the United States?

Mr. PASCO. No.

Senator MITCHELL. None at all. It was to be transferred, and they were to get their share in the property. That transaction contemplated that the new company would go on to construct the canal?

Mr. PASCO. Yes, sir.

Senator MITCHELL. Now, Mr. Pasco, is it not a fact that the new company is now and always has been a solvent company?

Mr. PASCO. I so understand.

Senator MITCHELL. Has it not a large amount of money in the treasury now?

Mr. PASCO. I do not know how much.

Senator MITCHELL. Three or more million dollars?

Mr. PASCO. It has money in its treasury.

Senator MITCHELL. Was there ever a time since it was organized when it was not solvent?

Mr. PASCO. I understand it has always been solvent and is now.

Senator MITCHELL. Now, I should like you to explain for my satisfaction how a court in France obtains jurisdiction of this company so as to authorize it, a solvent company, which always has been solvent, to transfer all its property in violation of the existing agreement by which it was to go on and construct this canal. How does the French court get jurisdiction to do that thing?

Mr. PASCO. The company has the power to dissolve itself whenever the circumstances justify.

Senator MORGAN. Under what law?

Mr. PASCO. Under its charter.

Senator MORGAN. You mean the statutes?

Mr. PASCO. Yes; we call it a charter. It is called the charter in the edition which we have.

Senator MORGAN. Have you a translation of that law?

Mr. PASCO. There is one in the appendices which we have submitted in our report. Now, the company has the right to sell and dispose of its interest. Then it is under obligations to the old company, to its

liquidator, which can only be relieved through the order of the court. The liquidator presents his petition to the court, setting forth all the facts, and the court considers them and authorizes the liquidator to join in that sale.

Senator KITTREDGE. What is the character and scope of the order that was obtained from the French court last August with reference to the negotiations between the New Panama Canal Company and the United States?

Mr. PASCO. It was then that the matter was presented to the court and the court authorized the liquidator to join in the sale.

Senator MORGAN. Have you a copy of that order?

Mr. PASCO. I have not with me. I think there is one here, General. I think Admiral Walker sent you one a day or two ago. There was no price fixed.

Senator PRITCHARD. The question of price was left discretionary with the liquidators?

Mr. PASCO. Yes; the price was left to the discretion of the liquidator. My judgment is that the court must approve of that price before the matter can be consummated.

Senator PRITCHARD. Undoubtedly so?

Mr. PASCO. That is the view I have always taken of it. We sometimes have cases in which mortgaged property may be rented or leased or operated for a time under an order of the court, and the property is ultimately sold. It seems to me not unlike this transaction. The court authorized the liquidator to contribute property to the new company, and he was to receive a share of the rents, issues, and profits of the transaction.

Senator MORGAN. Can you give a citation of those cases in which that has been done?

Mr. PASCO. I have met such cases frequently in my practice.

Senator MORGAN. Under the Florida decisions or the United States decisions?

Mr. PASCO. Why, there is nothing unusual in the court authorizing property to be made use of before it is sold.

Senator MORGAN. You do not cite any authority?

Mr. PASCO. I do not cite any authority; no.

Senator MITCHELL. What is troubling me is this: Of course, I want to get at the facts at the bottom of all these legal difficulties, if there are any legal difficulties. Here is a company that is insolvent and is in court, and it owns certain property.

Mr. PASCO. Which company do you mean?

Senator MITCHELL. I mean the old company. The old company owns a certain amount of property.

Mr. PASCO. The liquidator of the old company owns it.

Senator MITCHELL. The liquidator or receiver under the order of the court is authorized, acting for the old company and for the stockholders, to sell all this property to another company, to an outsider, on certain terms and conditions, the terms being that the new company shall go on and build the canal.

Mr. PASCO. And the court considering at that time that it was a favorable arrangement——

Senator MITCHELL. The old company, through the liquidator, as a consideration, is to receive 60 per cent of the net profits that shall accrue by reason of the construction of that canal. Now, that contract is

entered into. It is an accomplished fact. The title is vested in the new company, which is a solvent company. What is troubling me is this: How can the French courts make an order that will authorize the new company to divert the whole business from that contemplated by the original arrangement and sell out the whole thing for a certain specific sum to the United States or somebody else so as to bind in any manner, shape, or form the old company or individual stockholders? That is the question that is troubling me.

Mr. PASCO. At the time the order of sale was made that seemed to be the best use to which the property could be put. It was transferred to the new company with the understanding that the liquidator was to share in the rents, issues, and profits. But supposing a change takes place in the situation, and it is found that the original purpose can not be accomplished, and the court sees that it is to the better advantage of the stockholders and the creditors to have a final disposition made of the interests within its charge rather than to continue it under this former arrangement. Is it not within the power of the court to change the disposition of the property instead of continuing this use of it; to have it sold, and divide the proceeds among the party?

Senator MORGAN. You ask a question, and now I will be very much obliged to you if you will answer it.

Mr. PASCO. I say that was the action of the court. The court decided, in its judgment, that it is better that that arrangement be discontinued, and that a new arrangement be made by which the property is to be sold, and all the parties interested in it are to be allowed to receive their proper share of the proceeds.

Senator MORGAN. Do you think that the court had that authority?

Mr. PASCO. I do.

Senator MORGAN. Under what law?

Mr. PASCO. Under the law of France.

Senator MORGAN. Under what law of France?

Mr. PASCO. The law of France that the court has acted upon in these proceedings, and the judge decides what the law is.

Senator MORGAN. Can you cite that law?

Mr. PASCO. I can cite the action of the judge.

Senator PRITCHARD. The judge of that court has the same equitable power that he would have in this country, has he not?

Mr. PASCO. That is my understanding.

Senator MORGAN. I do not understand that. You say you understand he has the same equitable powers?

Mr. PASCO. Equitable powers of a character similar to those that would be exercised by a court of equity in this country.

Senator MORGAN. Do you know of any court of equity in this country that has even been decided to have any such powers?

Mr. PASCO. I know that in the large railroad litigation which we had in our State, which culminated some time after the war, the railroad was run, managed, and operated for years and years under different receivers under the order of the court, and finally the court ordered the sale of the property and it was sold.

Senator MORGAN. What court was it?

Mr. PASCO. The Florida State courts, and the case came up to the Supreme Court of the United States on more than one occasion before a final settlement.

Senator MORGAN. Can you cite the case?

Mr. PASCO. I can by getting at the index of the Supreme Court reports.

Senator MORGAN. That is a very important point, a very important question that the Senator asked you, and I want to get the authority.

Senator PRITCHARD. I think that goes to the bottom of the matter.

The CHAIRMAN. Yes; I was bringing Mr. Pasco up to that point.

Senator KITTREDGE. The order you speak of is the order of last August?

Mr. PASCO. It is the order which you refer to, which the court made authorizing the liquidator or receiver to make a sale.

Senator MORGAN. That was made last August?

Mr. PASCO. Yes.

Senator MITCHELL. What is the difference in time between the date of the first order authorizing the old company to transfer all its property to the new company and the date of the other order authorizing this subsequent arrangement?

Mr. PASCO. Well, this order is one that has just recently been made.

Senator MITCHELL. When was the other?

Mr. PASCO. The other, I think, was in 1894. I may be mistaken about the date. I can put in the exact date when I revise my testimony.

Senator MITCHELL. In 1894?

Mr. PASCO. Yes.

Senator MITCHELL. That is eight years ago.

Mr. PASCO. Yes.

Senator MITCHELL. A legal transfer had been made by the liquidator to the new company, had it not?

Mr. PASCO. An absolute transfer.

Senator MITCHELL. An absolute transfer of all the property?

Mr. PASCO. The company has no interest in it except its share in the profits. Of course, I mean the old company.

Senator MITCHELL. What I want to get at is, the title of the new company to the property transferred to it from the old company by the liquidator had vested in the new company years ago, had it not?

Mr. PASCO. Yes.

Senator PRITCHARD. That was in the nature of a lease, was it not?

Mr. PASCO. Well, you might call it in the nature of a lease; but the title was absolutely transferred, and all that the old company had in the new company's property was the right to participate in the profits—60 per cent of the net profits—after the net receipts were reached.

Senator PRITCHARD. Suppose the new company had refused to pay over the rents, issues, and profits. Then what would have been the power of the court over the case? The court would have had jurisdiction then to order a sale, would it not?

Mr. PASCO. I should think so; I have not considered that part of it.

Senator PRITCHARD. That would necessarily follow, I should think.

Mr. PASCO. There would have to be some remedy in the court to force it to carry out its contract, either by sale or in some other way.

Senator PRITCHARD. In other words, the court obtains the right to force the collection of any rents that they may have agreed to pay to the old company or to the stockholders of the old company.

Mr. PASCO. The rights of the liquidator were thoroughly recognized when he was ordered to contribute this property to the new company and when his action was afterwards ratified by the court.

Senator PRITCHARD. So the court does have jurisdiction of the subject-matter, to that extent at least?

Mr. PASCO. To that extent. In that charter there is authority to the liquidator to investigate the accounts, and so on, of the company, and that of course was done for the protection of the interests which he represented.

Senator MITCHELL. One other question right at that point: In this last arrangement by which the new company was authorized by the court to transfer all this property to the United States, if such an order was made, was there any stipulation as to the amount of consideration which should be paid or that they should receive?

Mr. PASCO. They were to receive this 60 per cent of the net profits. That is, the liquidator was to receive that.

Senator MITCHELL. That was in the first arrangement. I am speaking now of the last arrangement, by which the new company was authorized to transfer all its property to the United States. Was there anything said in those proceedings about the amount of money that they should receive?

Mr. PASCO. Out of the \$40,000,000?

Senator MITCHELL. No; about how much the new company should receive from the United States.

Mr. PASCO. Oh, no; not yet.

Senator MITCHELL. There was nothing said about whether they should sell for \$40,000,000 or \$100,000,000?

Mr. PASCO. No; the amount was not fixed. Absolute authority was given to the liquidator. I think the opinion of some of these gentlemen who represent the Panama Canal Company here, or are connected with it, is that it needs no further action of the court, but I do not agree with that view.

The CHAIRMAN. Do I understand that he has absolute authority to sell for any price that he may see fit?

Mr. PASCO. There is no limitation upon his power in that order.

Senator MITCHELL. Does he not have to report to the court?

Mr. PASCO. I say he must report to the court. I do not understand that these gentlemen admit that, but he must.

Senator MITCHELL. That is your opinion as a lawyer?

Mr. PASCO. He must report to the court, of course.

Senator MORGAN. What are the names of these gentlemen you are talking about?

Mr. PASCO. M. Lampre.

Senator MORGAN. He has testified here as a witness?

Mr. PASCO. Yes.

Senator MORGAN. Who else?

Mr. PASCO. Mr. Bœufvé.

Senator MORGAN. Are those the two persons you refer to and the only persons?

Mr. PASCO. Those are the persons I refer to.

Senator MORGAN. And the only ones? Are they the only persons?

Mr. PASCO. Those are the only persons that have presented this subject to the committee. I do not know that Mr. Bœufvé has expressed that view. I am speaking of M. Lampre.

Senator MITCHELL. Suppose this sale is consummated to the United States for \$40,000,000 and the report must be made to the court. Sup-

pose the stockholders or persons representing the stockholders in the old company come in and say to the court, "Here, we object; this property has been sold too cheaply." Suppose they should make a showing that would satisfy the liquidator, or satisfy the court, rather, that the sale should not be confirmed. What then?

Mr. PASCO. I should say it would not be confirmed if they could not make a proper showing.

Senator MITCHELL. Would not that lead to an interminable amount of trouble? Would not that get us into trouble?

Mr. PASCO. All these details can not be settled before Congress acts. The liquidator has accepted this offer. He is one of the parties to it, and I should think that his views would be likely to be acceptable to the court. But when this transfer of title is to be made the executive officers, whoever are appointed to carry it out, would be obliged to see that all these proceedings were correctly taken. It would be necessary to visit Paris. It would be necessary to see that these orders had been made. It would be necessary to see that the proper seals were attached and the proper forms gone through with; these steps must then be taken. All we can say now is that when a title is made in the proposed way, in our judgment, it will be a sufficient and proper title. We are informed by M. Lampre that there is no doubt but what the court will confirm the action of the liquidator.

Senator MORGAN. The Commission was so informed by him?

Mr. PASCO. Yes.

Senator MORGAN. Was he present before the Commission in making his statement?

Mr. PASCO. Not before the full Commission. He was present before Admiral Walker and myself.

Senator MORGAN. When was that?

Mr. PASCO. Within the last week or two.

Senator MORGAN. Since the last report was made to the President?

Mr. PASCO. Yes.

Senator MORGAN. Since that time?

Mr. PASCO. Yes, and before that.

Senator MORGAN. Did you and the admiral represent the Commission on these hearings?

Mr. PASCO. I do not think he came before the full Commission, although the full Commission has been here. The admiral and I have had many conversations with him. I am not sure; I can not say whether he was before the full Commission. I am a little in doubt about it. I think he was not.

The CHAIRMAN. The New Panama Canal Company valued its property at \$109,000,000, I believe?

Mr. PASCO. Yes; that was the estimate that was finally submitted.

The CHAIRMAN. This was the property which had been acquired by it from the old company?

Mr. PASCO. In part.

The CHAIRMAN. In part; and the new company now offers this entire property, with whatever it may have added, for the sum of \$40,000,000?

Mr. PASCO. Yes; that is the present proposition.

The CHAIRMAN. If the liquidator of the new company should agree to this price, can not the creditors and the stockholders come into court and declare that this is a sacrifice of their interests, that it is a direct diversion from the original contract of the obligations of the

new company, in that it accepts a certain sum of money, or compels them to accept a certain sum of money, instead of 60 per cent of the net profits? Laying this letter before the court, would they not be heard by the court and their rights decided upon, and will not that necessarily involve litigation of a very lengthy character?

Mr. PASCO. Well, the whole matter is in the control of the court now. I do not see that it would involve any extensive litigation.

The CHAIRMAN. Is this a court of final resort?

Mr. PASCO. There is a higher court, and an appeal could be made from the decision of this court within sixty days. I understand that is the time for an appeal in France. When the whole matter is within the control of the court, I do not see that there can be any extended litigation as to the mere question of price. The fact that these parties who have to protect an important interest are willing to sell for that price, and the fact that this Commission has valued their property at that price would all indicate that it was a just and fair price. Here is a Commission of the very highest character, so far as the engineers on it are concerned, who have gone very carefully through the country, made their examinations and their own investigations, who have reported to the United States Government that \$40,000,000 is the value of it. The stockholders of the new company accept that valuation. The liquidator accepts that valuation, and it would be hard to see any great risk in the court confirming the conclusion reached by these impartial engineers, reached by the stockholders of the new company, and reached by the liquidator.

Senator MITCHELL. Suppose this whole matter was left to the President of the United States, or the Secretary of State, or any other power or jurisdiction to pass upon the question as to whether the United States could obtain a good title to all this property. How long do you think it would take to end an investigation of that kind before any other steps could be taken looking to the construction of the canal?

Mr. PASCO. Oh, I think it could all be settled in a very short time. The materials for reaching a conclusion are within easy reach. We have in one of our appendices which you have not yet printed the documents which the Commission procured, and which contain the groundwork for a correct judgment upon most of these questions. Some proceedings have been taken since which were not in our hands at that time, but I think a capable, industrious, and intelligent lawyer like the Senator from Oregon could reach a conclusion in a very short time, and I think he would see in a very short time that the steps which have to be completed were properly completed.

Senator MITCHELL. Do you not think it would require a year at least.

Mr. PASCO. Oh, no.

Senator MITCHELL. Would it not require personal and thorough investigation in France?

Mr. PASCO. Well, France is only a short distance from us in the matter of time.

Senator MITCHELL. Would it not involve reaching a conclusion as to precisely what could be done in Colombia?

Mr. PASCO. There is where the great trouble is to come, Senator, whether we go to Nicaragua or to Panama. We have got to deal with a foreign government in either case, and I can not say anything as

to that, because that is for another department of the Government to deal with; but my judgment is that it would not take any longer to make an agreement with one country than with the other, and we have framed our report upon that supposition. Each of these countries, in acting in what they regard as a patriotic manner toward their own people, will not be carried away with any enthusiasm as to the immediate advantages they are going to derive from a canal now, but they will endeavor to get all the money they can out of the United States.

Senator MITCHELL. The Republic of Colombia is a stockholder in the New Panama Canal Company, is it not?

Mr. PASCO. Yes, sir.

Senator MITCHELL. To what extent?

Mr. PASCO. To 50,000 shares of 100 francs each.

Senator MITCHELL. That is an element to be considered, then, in the investigation of titles, as to whether you can get good titles?

Mr. PASCO. Well, that is an element that may be considered in making the treaty, because Colombia will not consent to the sale of the property at all unless her own interests are protected. She has the power to protect them when she is making this treaty with the United States.

The CHAIRMAN. The Colombian Government receives a part of the profits under their concessions?

Mr. PASCO. Yes; it is a rising scale of profits, not to amount to less than \$250,000 a year. Of course, she is going to see that her interests are protected.

The CHAIRMAN. Any agreement or treaty which the United States may make with Colombia will necessarily involve a complete abandonment practically of the conditions and terms of the contract of that Government with the canal company.

Mr. PASCO. I should say so.

Senator KITTREDGE. I think you were about to say something when the chairman asked you the last question. What was that?

Mr. PASCO. I do not know that I can recall it now. I was speaking, I think, of the desire on the part of these Republics to get all the money that they can. They will doubtless think it is their duty toward their people to make the United States pay as liberally as she is disposed to, whether we go to the one Republic or to the other. But the treaty-making power has got to settle the question as to whether we can occupy the territory of either of these Republics, and will have to settle the terms upon which it can be done, and we may find in the end that a great deal will depend upon the comparative liberality of the different Republics that we have to deal with.

The CHAIRMAN. The grant to this company was secured through the Congress of Colombia, was it not?

Mr. PASCO. It had to be approved by the Congress of Colombia.

The CHAIRMAN. Approved by the Congress of Colombia?

Mr. PASCO. Yes; that is requisite, I understand, under their law.

The CHAIRMAN. The Panama Railroad is owned and under the jurisdiction of a company in this country, is it not?

Mr. PASCO. Deriving its charter from the State of New York.

The CHAIRMAN. By this transfer from the Panama Canal Company the United States Government secures the shares of stock—the stock which this company owns?

Mr. PASCO. All but about 1,000 or 1,100 shares, somewhere in that neighborhood.

The CHAIRMAN. The ownership, however, of the property is in this corporation?

Mr. PASCO. In the Panama Railroad Company.

The CHAIRMAN. And that is a New York corporation?

Mr. PASCO. Its principal office is in New York, and these shares, belonging to the Panama Canal Company, are represented by the liquidator or receivers. The company owns a line of railroad and a line of steamers running between New York and Colon.

Senator MITCHELL. Have you considered the question as to the power of the United States to hold that stock?

Mr. PASCO. Well, there may be difficulties in connection with that. I suppose they can be arranged.

Senator MITCHELL. Now this proposition of the French company to sell certain property to the United States for \$40,000,000 includes the Panama Railroad and all property connected with it?

Mr. PASCO. Yes. It includes the shares in the railroad company.

Senator MITCHELL. Now, that company, I mean the new Panama Canal Company, does not own that property at all or any part of it, does it, except as it has an ownership there in certain stock.

Mr. PASCO. It owns nearly all the shares in the railroad company.

Senator MITCHELL. But as a matter of fact it does not own the property at all. The property is owned by the company organized under New York charter.

Mr. PASCO. Yes.

Senator MITCHELL. And having its principal office in the city of New York.

Mr. PASCO. Yes.

Senator MITCHELL. So that instead of transferring that property to us as a part of the consideration for the \$40,000,000, they simply propose to transfer all the stock of the company except eleven or twelve hundred shares, as you say.

Mr. PASCO. That is all they can do.

Senator MITCHELL. Does it not strike you that there is a very great difficulty there?

Mr. PASCO. Well, the United States, whether it constructs a canal at Nicaragua or at Panama, is obliged to own a railroad.

Senator MITCHELL. Unquestionably, but the question is whether they are getting any railroad.

Mr. PASCO. I think that matter can be arranged. I do not think that is a serious obstacle.

Senator KITTREDGE. In what manner do you think it can be arranged?

Mr. PASCO. Well, I do not know. I have no manner to propose now.

Senator MITCHELL. Do you think that company, I mean the Panama Railroad Company, has any power as a company to transfer the privileges that it obtained from the State of New York without the special consent of the State of New York.

Mr. PASCO. Well, it might require some legislation in New York to accomplish this. I am not familiar with the New York laws. There may be some power in the State of New York to dissolve corporations, and then the corporation could dispose of the property absolutely to the United States. I only throw that out as a suggestion.

Senator MITCHELL. Then again there are various and sundry bonds out, issued by that company and secured by mortgage on the railroad, are there not?

Mr. PASCO. Yes; there are some bonds out, but the railroad is doing a good business and it could soon pay off its obligations.

Senator MITCHELL. If we take the property we become liable for those debts, though.

Mr. PASCO. No; the company is liable for its debts, of course, but it is a good railroad. It is doing a good business, having two passenger and two freight trains that run each way over the track every day, with steamers at each end of the line doing a large carrying business, and transferring the cargoes from end to end. The history of the railroad shows that some years it has received very large profits, and the business it would do for the United States in the construction of the canal and in carrying workmen and passengers to and fro, as well as material, would be very large.

The subcommittee, at 11.55 a. m., took a recess until 2.30 p. m.

AFTER RECESS.

The subcommittee met at 2.30 p. m.

Present: Senators Foster (chairman), Harris, Hawley, Morgan, and Kittredge.

ADDITIONAL STATEMENT OF HON. SAMUEL PASCO.

Senator MORGAN. I notice that you have printed an article titled "The Isthmian canal question as affected by treaties and concessions," reprinted from the Annals of the American Academy of Political and Social Science for January, 1902.

Mr. PASCO. Yes; Professor Johnson, one of our members, is one of the assistant editors, and he asked me to prepare an article on that subject, and I did.

Senator MORGAN. When did you print this?

Mr. PASCO. In the January number.

Senator HAWLEY. Of what?

Mr. PASCO. Of the Annals of the American Academy of Political and Social Science, published by the University of Pennsylvania, by some of the officers and professors connected with it.

Senator MORGAN. I notice that in that article you state in regard to the treaty between the United States and New Granada of 1846 the following:

"In return for these advantages and to secure their tranquil enjoyment, the United States guarantee to New Granada the perfect neutrality of the Isthmus, so that the transit might not be interrupted during the existence of the treaty. On more than one occasion this guaranty has been effective in maintaining peace and protecting life and property in this region. This treaty was signed in December, 1846, but the ratifications were not exchanged until June, 1848."

I notice that you omit in that statement of the treaty to give this final language, in the first section of article 35:

"And in consequence, the United States also guarantees in the same manner the rights of sovereignty and property which New Granada has and possesses over the said territory."

Mr. PASCO. It was not intended to give the whole contents of the treaty. It was only a brief reference to that question.

Senator MORGAN. That was omitted?

Mr. PASCO. Yes, sir.

Senator MORGAN. I wanted to call your attention to it because I regard it as being an essential part of our present relations with Colombia, and then, further, that the present treaty shall remain in full force and vigor for the full term of twenty years, etc. That was the treaty with New Granada, now called Colombia.

Mr. PASCO. Yes.

Senator MORGAN. That treaty, as I understand it, leaves it in such an attitude as that either the United States or Colombia has the right to insist at the end of a year now, upon the formation of the treaty, but not upon its abrogation, so that the relations between the United States and Colombia are fixed permanently so far as that guaranty of sovereignty of Colombia over Panama is concerned.

Mr. PASCO. I think you will find that correctly stated in the report of the Commission in the chapter on franchises, and I think you will find it stated somewhere in that pamphlet that the guaranties of that treaty are still in force.

Senator MORGAN. You understand then, and the Commission, if I gather from you correctly, understands that the relations between the United States and Colombia, fixed by that treaty, obtain and are in full force and vigor at the present time.

Mr. PASCO. Yes; the international relations between the two Governments are fixed by that treaty at the present time.

Senator MORGAN. And that can only be changed by some act of the United States, consented to by the Government of Colombia?

Mr. PASCO. Yes, sir; by a new treaty.

Senator MORGAN. A treaty or a reformation, but not an abrogation?

Mr. PASCO. Yes, sir.

Senator MORGAN. In the reformation of that treaty would an act of Congress be necessary?

Mr. PASCO. An act of the United States Congress?

Senator MORGAN. And Colombia?

Mr. PASCO. The treaty would have to be made as any other treaty by the President, by and with the advice of the Senate, I suppose, of this country.

Senator MORGAN. How could that be when we undertake to protect with force, and, as you state here, have had forces down there on occasions to protect Colombia or to protect the railroad and canal against force or disturbance? Would not the Congress necessarily have to supply the men and force and the money necessary for carrying that treaty into execution?

Mr. PASCO. It would be the duty of Congress, of course, to carry out any such treaty.

Senator MORGAN. Therefore, whatever change takes place in the relations between the United States and Colombia as they exist to-day would have to be done, not only by the treaty-making power, but also by Congressional action.

Mr. PASCO. Well, I have never examined that point, but my judgment would be otherwise.

Senator MORGAN. You can see at once that it is a very important point as to whether or not our relations can be changed by treaty, or whether it must also be done by act of Congress.

Mr. PASCO. A treaty becomes the law of the land, and I understand it is the duty of both Houses of Congress to assist in carrying out its terms.

Senator MORGAN. It is a duty that the Senate can not prescribe to the House of Representatives.

Mr. PASCO. The Senate can not prescribe it; it can not force the members of the House to do their duty.

Senator MORGAN. No; as long as the House should insist on retaining relations with Colombia that would have to stand just as it is.

Mr. PASCO. We could not force the House; no, sir.

Senator MORGAN. I notice in the testimony given by Colonel Ernst before this committee at a previous time, he brings in the Wyse concession from Colombia and the amendment to it.

Mr. PASCO. They are all submitted in our final report in the appendixes.

Senator MORGAN. Are they printed?

Mr. PASCO. I do not think the appendixes have ever been printed, but they are all submitted by the Commission.

Senator MORGAN. Now, upon the subject of the concession of the canal privilege by Colombia to the Panama Canal Company, there appears to have been two contracts of extension of time, one of the liquidator—

Mr. PASCO. Have there not been three?

Senator MORGAN. Maybe three; yes, sir.

Mr. PASCO. Yes; I think three—two to the liquidator and one to the new company.

Senator MORGAN. Now, let us see whether that is a fact or not. The contract of extension furnished by Colonel Ernst, being a translation from the *Diario Oficial* of Bogota, April 15, 1893, No. 9125, recites that this is a contract—

“Between Marco F. Suarez, minister of foreign affairs, duly authorized by his excellency the vice-president of the Republic, and in accordance with the powers granted to the executive power by law 91 of 1892, hereinafter called ‘the Government,’ of the one part,

“And Francois Mange, engineer, director of the operations of the liquidation on the Isthmus, special representative of the receiver of the *Compagnie Universelle du Canal de Panama*, under powers of attorney granted him at Paris, January 24, 1893, hereinafter called ‘the concessionary,’ of the other part, it has been agreed to modify the contracts of March 23, 1878, and December 10, 1890, for the opening of an interoceanic canal across Colombian territory, in conformity with the following stipulations:”

And then he goes on to state what the agreement is. Now, the date of that is April 4, 1893.

Mr. PASCO. That is the date of extension?

Senator MORGAN. Yes.

Mr. PASCO. The Wyse contract was in 1878. That is Appendix GG to our report. The additional contract modifying that was December 10, 1890, which is Appendix HH, and the one you have referred to is the contract granting an extension to the Panama Canal Company in liquidation April 4, 1893, marked II.

Senator MORGAN. Have you got that contract of 1893 before you?

Mr. PASCO. No; I have not got it before me. I am referring to the contents of our report. It is one of the appendixes to the report, and

then there is another contract, a further extension of time to the new Panama company of April 25, 1900, marked JJ.

Senator MORGAN. Now I will read to you articles 1, 2, 3, and 4:

“ARTICLE 1.

“The extension of ten years granted in article first of the contract of 1890 to the receiver of the *Compagnie Universelle du Canal de Panama* remains in force, subject to the conditions then provided, except the second, which is modified by the extension until October 31, 1894, of the period within which the new company is to be formed and work on the canal is to be resumed in a serious and permanent manner.

“The term of ten years shall begin to run from the date of the formal organization of the new company.

“ART. 2.

“The concessionary or his successor acknowledges the validity of the former contracts and of the present contract, and binds himself to do, in France, all acts necessary to insure its validity. These proceedings are to be concluded not later than August 31 next.

“ART. 3.

“As compensation for the extension which the Government grants by article first, and to indemnify it for the advantages which it relinquishes accordingly, the concessionary or his successor acknowledges an indebtedness in favor of the Republic amounting to the sum of two million francs in gold (2,000,000 francs), which, added to the ten millions provided in article 4 of the contract of 1890, constitutes a total indebtedness of twelve million francs (12,000,000 francs) in favor of Colombia, exclusive of five million francs (5,000,000 francs) in ten thousand shares, also mentioned in the article aforesaid.

“ART. 4.

“The contracting parties further agree that from the twelve millions which have just been mentioned in the preceding article shall be deducted the sum of four million francs which the Colombian Government and treasury of the department of Panama owe to the company in liquidation for the loan of 1883 and its interest, and for services and material furnished to the administration of this department from 1881 to 1892. Accordingly, this debt becomes finally extinguished, leaving the Republic free from all obligation with regard to this matter, and reducing to eight million francs in gold (8,000,000 francs) the sum which the new company is to pay to the Government.”

That is the new company that was to be organized.

Mr. PASCO. Yes, sir.

Senator MORGAN. It was not then organized?

Mr. PASCO. It was not then organized.

Senator MORGAN. Now, the liquidators representing the new company and all that relates thereto made this contract with the Government of Colombia. Has that contract ever been changed?

Mr. PASCO. I do not think it has. There may be some modifications in the last extensions. All the obligations of course passed to the new company when it succeeded the liquidators.

Senator MORGAN. Now, this contract validates, with the exceptions that are herein provided, the previous agreements between Napoleon Wyse and the old company—validates them all and carries the title to the liquidators.

Mr. PASCO. The Colombian Government recognizes the title in the liquidator and afterwards the new company.

Senator MORGAN. Now, we will see about the “afterwards.” These two contracts that I have read from, or at least this contract which I have read from, which recites the former contract, fixes the title of this property in the liquidators. I mean this concession and the lands and the interests and all in the railroad, and everything of that kind in the liquidator of the old company. Now, I will read further from this contract:

“ART. 6.

“The Republic shall enter into possession and ownership, without need of previous judicial decision and without any indemnity, of the canal itself and the annexes dependent thereon, in conformity with the contracts of 1878 and 1890, in each of the following cases:

“If the new company shall not be organized within the period fixed by article first;

“If the work shall not be resumed within the period fixed by the same article;

“If the receiver sells the property which is to belong to the Republic in case of lapse or abandons its maintenance, all in conformity with the provisions of the previous contracts, saving and excepting deterioration arising from use, unavoidable causes, or from accident;

“If the inventory mentioned in article 7 of the present contract shall not be made;

“If the conditions of article 2 of the same contract shall not be fulfilled.

“ART. 7.

“A general inventory of the property of the company in liquidation, which shall comprise as well the property which is to belong to the Government in cases of lapse as that which is to belong to the company in liquidation, shall be prepared upon the Isthmus. It is understood that rolling stock and floating plant shall be comprised in this inventory, which is to be made in conjunction with the agent of the Government at Panama, and is to be completed not later than August 31, 1893.

“ART. 8.

“The security of seven hundred and fifty thousand francs (750,000 francs) deposited in conformity with the contract of 1898 by the canal company, and confirmed by the contract of 1890, shall be maintained as a guaranty for the fulfillment of the obligations arising from the said contracts and those to which the concessionary agrees by the present contract.

"ART. 9.

"Disputes which may arise between the contracting parties with regard to the present contract or the former contract shall be submitted to the supreme court of justice of Colombia.

"In conformity with the provisions of article 7 of law 145 of 1888, the concessionary waives the right to diplomatic intervention concerning the duties and rights arising from the three contracts, except in case of denial of justice."

Now, there is the title to that property, the concessions, and all that Colombia had to convey, vested in the liquidator of the old company, and all disputes arising between the parties with regard to the present contract or the former contract shall be submitted to the supreme court of Colombia. Now, if that is so, how do you, as a lawyer, get the jurisdiction to determine these questions into the courts of France?

Mr. PASCO. Colombia has recognized the transfer to the New Panama Canal Company in the subsequent concession; has recognized the act which was done in accordance with the decrees of the French courts.

Senator MORGAN. Well, it is impossible for us to get along without that concession, and unfortunately it is not here.

Mr. PASCO. It is in our appendixes; in Appendix JJ.

Senator MORGAN. As I remember, the Republic merely grants an extension to the new company of the time of complying with the contract without making any other change in the contract whatever.

Mr. PASCO. It leaves that alone. I would suggest, Senators, that Colombia has recognized the new company as formed in accordance with the——

Senator MORGAN. No doubt about that; but has the company changed the title of the liquidator of the old company which is vested by this treaty, by this contract?

Mr. PASCO. The new company could not have existed without the contribution of its property received from the liquidator of the old company. That is an essential part of the existence of the new company.

Senator KITTREDGE. The Colombian Government is a stockholder in the new company, is it not?

Mr. PASCO. Yes; to the extent of 50,000 shares.

Senator MORGAN. Not only that, but the liquidator is a stockholder as well as liquidator.

Mr. PASCO. Yes; the list of the stockholders is given here in the report.

Senator MORGAN. Now let me read article 11:

"ART. 11.

"The concessionary declares that he accepts all the provisions of the present contract which impose special obligations upon the receiver, as well as those which affect the company which may be formed."

He accepts all the obligations which may affect the company which may be formed. That is a part of his contract. Now, turning back to the old concession, that of 1890, December 10, signed by Antonio Roldan and Lucien N. B. Wyse, and which has what is called an "Only Article," which modifies the original contract between ourselves and

the Colombian Government, I will read some of the provisions of this first article which may or may not modify the original contract:

“The Government grants to the receiver of the *Compagnie Universelle du Canal de Panama* an extension of ten years within which the canal is to be finished and put in public operation; the said extension is consented to, subject to the following conditions.”

Has there been a later contract than that between them?

Mr. PASCO. There is that J.J., the last one; you have not read from the last one mentioned in the index as a contract granting a further extension of time to the New Panama Canal Company, April 25, 1900. That is made directly to the new company, after the old company's stock had become absorbed in it by this contribution, as it is termed in the charter, and in this new company the Colombian Government was a stockholder to the amount of 50,000 shares of 100 francs each.

Senator MORGAN. In the first subdivision of Article I, I find the following:

“THE CONGRESS OF COLOMBIA,

“*Decrees:*

“ONLY ARTICLE. The contract modifying that of March 23, 1878, for the opening of an interoceanic canal across Colombian territory, concluded between H. E. the Minister of Foreign Affairs and Mr. Lucien N. B. Wyse, special representative of the receiver of the *Compagnie Universelle du Canal de Panama*, is approved in all its parts, which contract is literally as follows:

“Antonio Roldan, minister of foreign affairs, duly authorized by his excellency the President of the Republic, hereinafter called the ‘Government,’ of the one part, and Lucien N. B. Wyse, naval commander, engineer, original concessionary of the interoceanic canal, and special delegate of the receiver of the *Compagnie Universelle du Canal de Panama*, under powers of attorney executed at Paris May 16, 1890, hereinafter called the ‘concessionary,’ of the other part, have agreed to modify the contract of March 28, 1878, for the opening of an interoceanic canal across Colombian territory, approved by law 28 of the same year, in accordance with the following stipulations:

“ARTICLE FIRST. The Government grants to the receiver of the *Compagnie Universelle du Canal de Panama* an extension of ten years within which the canal is to be finished and put in public operation; the said extension is consented to subject to the following conditions:

“*First.* The concessionary agrees to transfer all the plant of the company in liquidation to a new company, which shall undertake the completion of the work of the interoceanic canal.

“*Second.* The new company shall be formally organized with a capital sufficient for this purpose, and shall resume the work of excavation in a serious and permanent manner not later than February 28, 1893.

“*Third.* The concessionary, or his successors, shall furnish monthly to the National Government at Panama the sum of ten thousand (10,000) piastres, in Colombian coin of 0.835, for the maintenance of two hundred and fifty (250) men of the military garrison of the department of Panama, whom the Government undertakes to assign for the preservation of order and for the security of the line of the canal during the work of excavation and upon its termination for the protection of interoceanic transit.

“In case the company should have need of a greater number of men of the public forces, the Government will assign them to said service, taking them from the military garrison of the department, but the additional expense occasioned by this increase, reckoned upon the basis already established, shall also be borne by the company.

“The company binds itself to furnish places set apart for the occupancy of the troops upon points on the line at which the Government has none of its own. The last part of article 8 of the original contract for the privilege is modified in these respects.

“*Fourth.* The navigation of the lakes which may form part of the canal shall be free to small vessels, in accordance with the regulations which the company may prescribe for this purpose. The latter shall not be responsible for the inherent risks of this navigation. The internal regulation of the lakes shall be settled by the Government at the proper time, taking into account the general interests of the enterprise.

“*Fifth.* The company binds itself to reestablish public transit at the mouth of the Rio Grande by means of bridges or boats, as it shall consider most practicable; and if, in consequence of the number of vessels, passage should become hereafter too difficult, the company shall reestablish it between Emperador and Arraijan to the satisfaction of the Government.

“ARTICLE SECOND. Beside the public lands granted gratis by the contract of 1878, the expropriation of lands, buildings, and plantations which shall prove necessary to the canal, and its dependencies, shall be made by the Government on account of the company, in conformity with the ninth condition of article first of the aforesaid contract, approved by law 28 of 1878.

“Such expropriations shall be made with all speed which the legislation of the country upon the subject permits. The expropriated real estate shall be immediately delivered over to the concessionary, or his successors.

“ARTICLE THIRD. The Government also undertakes to take the necessary steps for restoring to the new company the complete enjoyment of the lands belonging to the company in liquidation unlawfully occupied by private persons, and to procure a judicial decree that all persons who, without previous consent, shall have built or planted upon the lands bought by the company in liquidation for the purpose of works of excavation, installation, and unloading, shall have no right to any indemnity.

“ARTICLE FOURTH. As compensation for the services which the Government agrees to render, in accordance with the two preceding articles, the concessionary, or his successors, shall pay to the Government ten million (10,000,000) francs, in gold, and shall issue to it, gratis, in addition, five million (5,000,000) francs in ten thousand (10,000) dividend-bearing shares of the new company of five hundred (500) francs each, full paid, having the right to no other dividends than those which are declared on ordinary shares. The said ten thousand (10,000) shares shall remain attached to their respective stubs until the other shares shall be full paid, but, upon notice to the company, the Government shall have the power, when it shall see fit, to assign or pledge them.

“The ten million (10,000,000) francs to which this article refers shall be paid by the concessionary, or by his successors, in five (5) equal

annual installments; the first being paid three (3) months after the new company for the completion of the canal shall be fully organized, in conformity with the second condition of article first. From this sum shall be deducted two million five hundred thousand (2,500,000) francs, as well as the interest accrued up to the date of the present contract, which the Government owes to the company in liquidation for the loan of 1883, the deduction being made, in the first place, for the purpose of fixing the amount of the five (5) installments just mentioned. By this payment the said loan shall be finally discharged.

“ARTICLE FIFTH. A special member, whom the Government has the right to appoint in the company's board of directors, in conformity with article 20 of the contract in force, shall enjoy in the new company to be organized for the completion of the canal, the same advantages and compensation granted to the other directors by the charter of the company, but neither the said appointee nor the official agent of the Government residing in the Isthmus shall make any publication relative to the company without the express authorization of the Government.

“ARTICLE SIXTH. If the new company for the completion of the canal shall not be organized, and if the work of excavation on the canal shall not be resumed within the period fixed by the second condition of article first, the contract in force shall lapse and the Republic shall enter into the possession and enjoyment, without the necessity of a previous judicial decree, and without indemnity, of the works of the canal and its annexes, which revert to it in accordance with article third of the contract of 1878.

“*Sec. 1st.* It is understood that the contract shall also lapse, and the provisions of this article shall become applicable if, the company for the completion of the canal not being organized before February 28, 1893, the legal representative of the Compagnie Universelle du Canal Interoceanique, or his successors, abandon the maintenance of the works, plant, and buildings now existing upon the Isthmus and belonging to the company.

“*Sec. 2nd.* The maintenance of the property enumerated in the preceding paragraph shall be considered abandoned when the legal representative of the Compagnie Universelle du Canal Interoceanique, in liquidation, or his successors, shall discharge the force of employees which he now has on the Isthmus, or shall cease to make the necessary expenditure for preventing the loss or deterioration of the said property.

“*Sec. 3rd.* It is, moreover, understood that the buildings, plant, works, and improvements which are to become the property of the Republic under the circumstances provided in this article, and in conformity with article 23 of the contract of 1878, shall be inalienable, and are to be in good condition, subject to deterioration arising from use, from unavoidable causes, or from accident.

“ARTICLE SEVENTH. As soon as the company for the completion of the canal shall be legally organized, and shall have resumed the work, in conformity with the provisions of the second condition of article first of this contract, the Government shall assign to it in the department of Panama the two hundred and fifty thousand (250,000) hectares of public lands to which it has been already declared by decisions of the executive power to be entitled, and shall issue to it the respective patents, provided that the legal formalities in the premises be accomplished on the part of the company.

“ARTICLE EIGHTH. The security of seven hundred and fifty thousand (750,000) francs deposited by the canal company in accordance with article second of the contract in force shall be maintained as a guaranty for the fulfillment of the obligations arising from the said contract, and of those assumed by the concessionary under the provisions of the present contract.

“ARTICLE NINTH. All rights and obligations created by the contract of March 23, 1878, for the opening of an interoceanic canal across Colombian territory, approved by law 28 of the same year, shall continue in full force and vigor without other restrictions and modifications than those contained in the present contract.

“ARTICLE TENTH. In order that the present contract may have full force and effect, it shall be submitted to the approval of His Excellency the President of the Republic, and to that of Congress.”

Now, all of these concessions have become acts of Congress, as I understand it, of Colombia; they are the only contracts with the liquidator of the old canal company, or the new company, and they have become laws. Now in a concession to Mr. Wyse to which these other concessions refer, that I have mentioned, it is a contract that reads as follows:

“CONTRACT FOR THE CONSTRUCTION OF AN INTEROCEANIC CANAL ACROSS
COLOMBIAN TERRITORY.

“Eustorgio Salgar, secretary of the interior and of foreign relations of the United States of Colombia, duly authorized, of the one part, and of the other part Lucien N. B. Wyse, chief of the Isthmus Scientific Surveying Expedition in 1876, 1877, and 1878, member and delegate of the board of directors of the International Interoceanic Canal Association, presided by General Etienne Türr, in conformity with powers bestowed at Paris, from the 27th to the 29th of October, 1877, have celebrated the following contract:

“ARTICLE 1. The Government of the United States of Colombia grants to Mr. Lucien N. B. Wyse, who accepts it in the name of the civil International Interoceanic Canal Association, represented by their board of directors, the exclusive privilege for the construction across its territory, and for the operating of a canal between the Atlantic and Pacific oceans. Said canal may be constructed without restrictive stipulations of any kind.

“This concession is made under the following conditions:

“First. The duration of the privilege shall be for ninety-nine years from the day on which the canal shall be wholly or partially opened to public service, or when the grantees or their representatives commence to collect the dues on transit and navigation.

“2d. From the date of approbation by the Colombia Congress for the opening of the interoceanic canal the Government of the Republic can not construct, nor concede to any company or individual, under any consideration whatever, the right to construct another canal across Colombian territory which shall communicate the two oceans. Should the grantees wish to construct a railroad as an auxiliary to the canal, the Government, with the exception of existing rights, can not grant to any other company or individual the right to build another interoceanic railroad, nor do so itself during the time allowed for the construction and use of the canal.

“3d. The necessary studies of the ground and the route for the line of the canal shall be made at the expense of the grantees by an international commission of individuals and competent engineers, in which two Colombian engineers shall take part. The commission shall determine the general route of the canal and report to the Colombian Government directly, or to its diplomatic agents in the United States or Europe, upon the results obtained, at the latest in 1881, unless unavoidable circumstances clearly proven should prevent their so doing. The report shall comprise in duplicate the scientific labors performed and an estimate of the projected work.

“4th. The grantees shall then have a period of two years to organize a universal joint stock company, which shall take charge of the enterprise and of the construction of the canal. This term shall commence from the date mentioned in the preceding paragraph.

“5th. The canal shall be finished and placed at the public service within the subsequent twelve years after the formation of the company which will undertake its construction, but the executive power is authorized to grant a further maximum term of six years in the case of encountering superhuman obstacles beyond the power of the company and, if after one-third of the canal is built, the company should acknowledge the impossibility of concluding the work in the said twelve years.

“6th. The canal shall have the length, depth, and all other conditions requisite in order that sailing vessels and steamships measuring up to 140 meters long, 16 meters in width, and 8 meters in draught shall, with lowered topmast, be able to pass the canal.

“7th. All public lands which may be required for the route of the canal, the ports, stations, wharves, moorings, warehouses, and in general for the construction and service of the canal as well as for the railway, should it be convenient to build it, shall be ceded gratis to the grantees.

“8th. These unoccupied public lands shall revert to the Government of the Republic with the railroad and canal at the termination of this privilege. There is also granted for the use of the canal a belt of land two hundred meters wide on each side of its banks throughout all the distance which it may run, but the owners of lands on its banks shall have free access to the canal and its ports as well as the right of use of any roads which the grantees may open there; and this without paying any dues to the company.

“9th. If the lands through which the canal shall pass, or upon which the railroad may be built, should, in whole or in part, be private property, the grantees shall have the right to demand their expropriation by the Government according to all the legal formalities in such cases. The indemnity which shall be made to the landowners, and which shall be based on their actual value, shall be at the expense of the company. The grantees shall enjoy in this case, and in those of temporary occupation of private property, all the rights and privileges which the existing legislation confers.

“10th. The grantees may establish and operate at their cost the telegraph lines which they may consider useful as auxiliaries in the building and management of the canal.

“11th. It is, however, stipulated and agreed that if, before the payment of the security determined upon in article 2, the Colombian Government should receive any formal proposal, sufficiently guaranteed, in the opinion of the said Government, to construct the canal in less

time and under more advantageous conditions for the United States of Colombia, said proposal shall be communicated to the grantees or their representatives, that they may be substituted therein, in which case they shall be preferred; but if they do not accept such substitution, the Colombian Government, in the new contract which they may celebrate, shall exact, besides the guarantee mentioned in article 2, the sum of three hundred thousand dollars in coin, which shall be given as indemnity to the grantees.

“ART. 2. Within the term of twelve months from the date at which the international commission shall have presented the definite results of their studies the grantees shall deposit in the bank or banks of London, to be designated by the national executive power, the sum of seven hundred and fifty thousand francs, to the exclusion of all paper money, as security for the execution of the work. The receipt of said banks shall be a voucher for the fulfillment of said deposit. It is understood that if the grantees should lose that deposit by virtue of the stipulations contained in clauses 2 and 3 of article 22 of the present contract, the sum referred to, with interest accrued, shall become *in toto* the property of the Colombian Government. After the conclusion of the canal, said sum, without interest, which latter will in this case belong to grantees, shall remain for benefit of the treasury, for the outlays which it may have incurred or may incur in the construction of buildings for the service of the public officers.

“ART. 3. If the line of the canal to be constructed from sea to sea should pass to the west and to the north of the imaginary straight line which joins Cape Tiburon with Garachiné Point, the grantees must enter into some amicable arrangement with the Panama Railroad Company, or pay an indemnity, which shall be established in accordance with the provisions of law 46, of August 16, 1867, ‘approving the contract celebrated on July 5, 1867, reformatory of the contract of April 15, 1850, for the construction of an iron railroad from one ocean to the other through the Isthmus of Panama.’

“In case the international commission should choose the Atrato or some other stream already navigable as one of the entrances to the canal, the ingress and egress by such stream, and the navigation of its waters, so long as it is not intended to cross the canal, shall be open to commerce and free from all imposts.

“ART. 4. Besides the lands granted in paragraphs 7 and 8 of article 1 there shall be awarded to the grantees, as an aid for the accomplishment of the work, and not otherwise, five hundred thousand hectares of public lands, with the mines they may comprise, in the localities which the company may select. This award shall be made directly by the national executive power. The public lands situated on the seacoast, on the borders of the canal or of the rivers, shall be divided in alternate lots between the Government and the company, forming areas of from one to two thousand hectares. The measurements for the allotment or locating shall be made at the expense of the grantees and with the intervention of Government commissioners. The public lands thus granted, with the mines they may hold, shall be awarded to the grantees as fast as the work of construction of the canal progresses, and in accordance with rules to be laid down by the executive power.

“Within a belt of two myriameters on each side of the canal, and during five years after the termination of the work the Government

shall not have the right to grant other lands beyond the said lots until the company shall have called for the whole number of lots granted by this article.

“ART. 5. The Government of the Republic hereby declares the ports at each end of the canal, and the waters of the latter from sea to sea, to be neutral for all time; and consequently, in case of war among other nations, the transit through the canal shall not be interrupted by such event, and the merchant vessels and individuals of all nations of the world may enter into said ports and travel on the canal without being molested or detained. In general, any vessel may pass freely without any discrimination, exclusion, or preference of nationalities or persons on payment of the dues and the observance of the rules established by the company for the use of the canal and its dependencies. Exception is to be made of foreign troops, which shall not have the right to pass without permission from Congress, and of the vessels of nations which, being at war with the United States of Colombia, may not have attained the right to pass through the canal at all times by public treaties wherein is guaranteed the sovereignty of Colombia over the Isthmus of Panama and over the territory whereon the canal is to be cut, besides immunity and neutrality of the said canal, its ports, bays, and dependencies and the adjacent seas.

“ART. 6. The United States of Colombia reserves to themselves the right to pass their vessels, troops, ammunitions of war at all times and without paying any dues whatever. The passage of the canal is strictly closed to war vessels of nations at war, and which may not have acquired, by public treaty with the Colombian Government, the right to pass by the canal at all times.

“ART. 7. The grantees will enjoy the right during the whole time of the privilege to use the ports at the termini of the canal, as well as intermediate points, for the anchorage and repair of ships, and the loading, depositing, transshipping, or landing of merchandise. The ports of the canal shall be open and free to the commerce of all nations, and no import duties shall be exacted, except on merchandise destined to be introduced for the consumption of the rest of the Republic. The said ports shall, therefore, be open to importations from the commencement of the work, and the custom-houses and the revenue service which the Government may deem convenient for the collection of duties on merchandise destined for other portions of the Republic shall be established, in order to prevent introduction of smuggled goods.

“ART. 8. The executive power shall dictate, for the protection of the financial interests of the Republic, the regulations conducive to the prevention of smuggling, and shall have the power to station, at the cost of the nation, the number of men which they may deem necessary for that service.

“Out of the indispensable officials for that service ten shall be paid by the company, and their salaries shall not exceed those enjoyed by employés of the same rank in the Barranquilla custom-house.

“The company shall carry gratis through the canal, or on the auxiliary railway, the men destined for the service of the nation, for the service of the State through whose territory the canal may pass, or for the service of the police, with the object of guarding against foreign enemies or for the preservation of public order, and shall also transport gratis the baggage of such men, their war materials, armament, and clothing which they may need for the service assigned to them.

“The subsistence of the public force which may be deemed necessary for the safety of the interoceanic transit shall likewise be at the expense of the company.

“ART. 9. The grantee shall have the right to introduce, free of import or other duties of whatever class, all the instruments, machinery, tools, fixtures, provisions, clothing for laborers, which they may need during all the time allowed to them for the construction and use of the canal. The ships carrying cargoes for the use of the enterprise shall enjoy free entry into whatever point shall afford them easy access to the line of the canal.

“ART. 10. No taxes, either national, municipal, of the State, or of any other class, shall be levied upon the canal, the ships that navigate it, the tugs and vessels at the service of the grantees, their warehouses, workshops, and offices, factories of whatever class, storehouses, wharves, machinery, or other works or property of whatever character belonging to them, and which they may need for the service of the canal and its dependencies during the time conceded for its construction and operation. The grantees shall also have the right to take from unoccupied lands the materials of any kind which they may require without paying any compensation for the same.

“ART. 11. The passengers, money, precious metals, merchandise, and articles and effects of all kinds which may be transported over the canal shall also be exempt from all duties, national, municipal, transit, and others. The same exemption is extended to all articles and merchandise for interior or exterior commerce which may remain in deposit, according to the conditions which may be stipulated, with the company in the storehouses and stations belonging to them.

“ART. 12. Ships desiring to cross the canal shall present at the port of the terminus of the canal at which they may arrive their respective registers and other sailing papers prescribed by the laws and public treaties, so that the vessels may navigate without interruption. Vessels not having said papers, or which should refuse to present them, may be detained and proceeded against according to law.

“ART. 13. The Government allows the immigration and free access to the lands and shops of the grantees of all the employés and working-men, of whatever nationality, who may be contracted for the work, or who may come to engage themselves to work on the canal, on condition that such employés or laborers shall submit to the existing laws and to the regulations established by the company. The Government promises them support and protection and the enjoyment of their rights and guarantees, in conformity with the national constitution and laws, during the time they may sojourn on Colombian territory.

“The *national peons* and laborers employed on the work of the canal shall be exempt from all requisition of military service, national as well as of the State.

“ART. 14. In order to indemnify the *grantees* of the construction, maintenance, and working expenses incurred by them they shall have, during the whole period of the privilege, the exclusive right to establish and collect for the passage of the canal and its ports the dues for light-houses, anchorage, transit, navigation, repairs, pilotage, towage, hauling, storage, and of station, according to the tariff which they may issue, and which they may modify at any time under the following express conditions:

“1st. They shall collect these dues, without any exceptional favor from all vessels in like circumstances.

“2d. The tariffs shall be published four months before their enforcement in the *Diario Oficial* of the Government, as well as in the capitals and the principal commercial ports of the countries interested.

“3d. The principal navigation dues to be collected shall not exceed the sum of ten francs for each cubic meter resulting from the multiplication of the principal dimensions of the submerged part of the ship in transit (length, breadth, and draught).

“4th. The principal dimensions of the ship in transit—that is to say, the maximum exterior length and breadth at the water line, as well as the greatest draught—shall be the metrical dimensions inserted in the official clearance papers, excepting any modifications supervening during the voyage. The ships’ captains and the company’s agents may demand a new measurement, which operations shall be carried out at the expense of the petitioner; and,

“5th. The same measurement—that is to say, the number of cubic meters contained in the parallelopipedon circumscribing the submerged part of the ship—shall serve as a basis for the determination of the other accessory dues.

“ART. 15. By way of compensation for the rights and exemptions which are allowed to the grantees in this contract the Government of the Republic shall be entitled to a share amounting to five per cent on all collections made by the company, by virtue of the dues which may be imposed in conforming with article 14, during the first twenty-five years after the opening of the canal to the public service. From the twenty-sixth up to the fiftieth year, inclusive, it shall be entitled to a share of six per cent; from the fifty-first to the seventy-fifth to seven per cent, and from the seventy-sixth to the termination of the privilege to eight per cent. It is understood that these shares shall be reckoned, as has been said, on the gross income from all sources, without any deduction whatever for expenses, interest on shares, or on loans or debts against the company. The Government of the Republic shall have the right to appoint a commissioner or agent, who shall intervene in the collections and examine the accounts, and the distribution or payment of the shares coming to the Government shall be made in due half-yearly installments. The product of the five, six, seven, and eight per cent shall be distributed as follows:

“Four-fifths of it shall go to the Government of the Republic, and the remaining one-fifth to the government of the State through whose territory the canal may pass.

“The company guarantees to the Government of Colombia that the share of the latter shall in no case be less than the sum of two hundred and fifty thousand dollars a year, which is the same as that received as its share in the earnings of the Panama Railroad, so that if, in any year, the five per cent share should not reach said sum it shall be completed out of the common funds of the company.

“ART. 16. The grantees are authorized to require payment in advance of any charges which they may establish; nine-tenths of these charges shall be made payable in gold, and only the remaining one-tenth part shall be payable in silver of twenty-five grammes, of a fineness of 900.

“ART. 17. The ships which shall infringe upon the rules established by the company shall be subject to the payment of a fine which said company shall fix in its regulations, of which due notice shall be given to the public at the time of the issue of the tariff. Should they refuse to pay said fine, nor furnish sufficient security, they may be detained

and prosecuted according to the laws. The same proceedings may be observed for the damages they may have caused.

“ART. 18. If the opening of the canal shall be deemed financially possible, the grantees are authorized to form, under the immediate protection of the Colombian Government, a universal joint stock company, which shall undertake the execution of the work, taking charge of all financial transactions which may be needed. As this enterprise is essentially international, and for public utility, it is understood that it shall always be kept free from political influences.

“The company shall take the name of ‘The Universal Interoceanic Canal Association;’ its residence shall be fixed in Bogota, New York, London, or Paris, as the grantees may choose; branch offices may be established wherever necessary. Its contracts, shares, bonds, and titles of its property shall never be subjected by the Government of Colombia to any charges for registry, emission, stamps, or any similar imposts upon the sale or transfer of these shares or bonds, as well as on the profits produced by these values.

“ART. 19. The company is authorized to reserve as much as 10 per cent of the shares emitted to form a fund of shares to the benefit of the founders and promoters of the enterprise. Of the products of the concern the company take, in the first place, what is necessary to cover all expenses of repairs, operations, and administration, and the share which belongs to the Government, as well as the sums necessary for the payment of the interest and the amortization of the bonds, and, if possible, the fixed interest or dividend of the shares; that which remains will be considered as net profit, out of which 80 per cent at least will be divided among the shareholders.

“ART. 20. The Colombian Government may appoint a special delegate in the board of directors of the company whenever it may consider it useful to do so. This delegate shall enjoy the same advantages as are granted to the other directors by the by-laws of the company.

“The grantees pledge themselves to appoint in the capital of the Union, near the National Government, a duly authorized agent for the purpose of clearing up all doubts and presenting any claims to which this contract may give rise. Reciprocally, and in the same sense, the Government shall appoint an agent, who shall reside in the principal establishment of the company situated on the line of the canal; and, according to the national constitution, the difficulties which may arise between the contracting parties shall be submitted to the decision of the Federal supreme court.

“ART. 21. The grantees, or those who in the future may succeed them in their rights, may transfer these rights to other capitalists or financial companies, but it is absolutely prohibited to cede or mortgage them under any consideration whatever to any nation or foreign government.

“ART. 22. The grantees, or their representatives, shall lose the right hereby acquired in the following cases:

“1st. If they do not deposit, on the terms agreed upon, the sum which by way of security must insure the execution of the work.

“2d. If, in the first year of the twelve that are allowed for the construction of the canal, the works are not already commenced, in this case the company shall lose the sum deposited by way of security, together with the interest that may have accrued, all of which will remain for the benefit of the Republic.

“3d. If, at the end of the second period fixed in paragraph 5 of article 1, the canal is not transitable, in this case also the company shall lose the sum deposited as security; which, with the interests accrued, shall remain for the benefit of the Republic;

“4th. If they violate the prescriptions of article 21; and,

“5th. If the service of the canal should be interrupted for a longer period than six months without its being occasioned by the acts of God, &c.

“In cases 2, 3, 4, and 5 the Federal supreme court shall have the right to decide whether the privilege has become annulled or not.

“ART. 23. In all cases of decisions of nullity, the public lands mentioned in clauses 7 and 8 of article 1, and such lands as are not settled or inhabited from among those granted by article 4, shall revert to the possession of the Republic in the condition they may be found in, and without any indemnity whatever, as well as the buildings, materials, works, and improvements which the grantees may possess along the canal and its accessories. The grantees shall only retain their capital, vessels, provisions, and in general all movable property.

“ART. 24. Five years previous to the expiration of the ninety-nine years of the privilege the executive power shall appoint a commissioner to examine the condition of the canal and annexes, and, with the knowledge of the company or its agents on the Isthmus, to make an official report, describing in every detail the condition of the same and pointing out what repairs may be necessary. This report will serve to establish in what condition the canal and its dependencies shall be delivered to the National Government on the day of expiration of the privilege now granted.

“ART. 25. The enterprise of the canal is reputed to be of public utility.

“ART. 26. This contract, which will serve as a substitute for the provisions of law 33, of May 26, 1876, and the clauses of the contract celebrated on the 28th of May of the same year, shall be submitted for the approval of the President of the Union and the definite acceptance by the Congress of the nation.”

Now, I have read all of this to the purpose of bringing your attention to the question of whether this is not an international obligation.

Mr. PASCO. What do you mean?

Senator MORGAN. Whether it is not an obligation in which the country where the company shall be located—it has been located in France—would have the right to regard its citizens as having acquired international rights, according to the language of this paper.

Mr. PASCO. I think the courts of France are competent to protect the rights of the citizens of France, and acts performed under the authority of the courts of France could not be objected to by the French Government as I can see.

Senator MORGAN. If that is your construction, and that the Government of France has no connection with it—

Mr. PASCO. The Government of France has no direct connection with it. It is not a stockholder.

Senator MORGAN. If that is your construction, and you seem to say that it is, then I will ask you what is the meaning of the phrase as you understand it—

Mr. PASCO. I think that if Colombia was to violate any of the rights of the citizens of France, the usual steps to protect its citizens would

be taken, but the acts here referred to are acts performed under the authority of the courts of France.

Senator MORGAN. If that is your construction, what do you do with the language in the latter clause of article nine, of the agreement between the liquidator and the Government of Colombia:

“April 5, 1893. In conformity with the provision of article 7 of law 145 of 1888, the concessionary waives the right to diplomatic intervention concerning the duties and rights arising from the three contracts, except in the case of the denial of justice.”

Suppose that the concessionary insists that there is a denial of justice, has he not the right under this article 9 to appeal to the Government of France?

Mr. PASCO. But these acts that we are talking about are the acts that have been performed under the authority of the courts of France; they are not acts of injury done to Colombia; they are acts that have been approved by the courts of France, and the courts have jurisdiction of the subject.

Senator MORGAN. You adhere to that opinion very closely, and you make a good argument on it, but I want an answer from you on this proposition as a lawyer.

Mr. PASCO. Of course if Colombia was to interfere with the rights of the French company owning the concession there would be the usual diplomatic correspondence with Colombia to see why she had injured the citizens of France, but there is nothing of that sort.

Senator MORGAN. Isn't there, under this article 9, an expressed and necessary reservation of right of diplomatic interference in the case in which the concessionary, the liquidator, says that there has been a denial of justice by the Colombian Government?

Mr. PASCO. Oh, yes; if the Government of Colombia was to perform any act that was being complained of there would be a right without the existence of that paragraph in the concessions; there would be a right of France to inquire why it is that her citizens are unjustly and wrongfully treated.

Senator MORGAN. I am bound to take issue with you on that proposition. In the diplomatic history of the United States this Government has uniformly refused to interfere in matters of private contracts between one of its citizens with a foreign government, no matter what the injustice might be that was committed by the foreign government. I refer you to the case of the Norwegian ship against the Government of Brazil. That was a ship that was chartered here in the city of New York and fixed up expressly for the purpose to carry ex-Confederates to Brazil. The Government of Brazil repudiated the contract after the ship had been fixed up, and the owner of the ship applied to us—and you were in the Senate at the time—to compel the Government of Brazil to pay the chartered party, and our Government refused to interfere, except merely to ask the Brazilian Government what was the situation. So I must take issue with you on the proposition that a private contract between citizens of the United States and a foreign government is a subject of diplomatic intercourse.

Mr. PASCO. I am not here to argue the matter with you, Senator, but we have had recent cases where the Italian Government complained of injuries done to her citizens in the United States, and the United States Government has paid moneys in satisfaction of the injuries done to the families in Italy, of those who were damaged by

the reason of the injury to the citizens of Italy in the United States.

Senator MORGAN. You speak of the Mafia and other cases located in Louisiana?

Mr. PASCO. I do; yes, sir.

Senator MORGAN. In all of those cases the Government voted the money as a pure gratuity, as an act of benevolence, just as it did in the case of the Chinese.

Senator HAWLEY. Yes; that is what I was going to say—*ex gracia*.

Senator MORGAN. When it comes to a question of right, a private citizen has no right to appeal against contracts that he has made with a foreign government, in reference to them, to the diplomatic power of the United States Government.

Mr. PASCO. Has not England on more than one occasion sent her vessels of war to settle claims of that sort?

Senator MORGAN. Never a private claim. No, sir; claims of injuries done by the authorities of foreign governments.

Mr. PASCO. Is not the injury a basis for a private claim?

Senator MORGAN. Yes; the injury is so founded. I am speaking now of the contracts.

Mr. PASCO. Yes, sir.

Senator MORGAN. Is not that an express reservation in article 6, that in the event that this company insists that it has been denied justice, that it has the right to appeal to its home Government, Paris being the Government, because it was located there?

Mr. PASCO. I have already expressed my opinion on that.

Senator MORGAN. Adversely to the proposition?

Mr. PASCO. I think that the Government of France would have a right to complain and enter upon diplomatic negotiations in reference to any injury that was done to her citizens in Colombia in connection with that treaty or outside of that treaty.

Senator MORGAN. That is the common right of all governments. I am speaking of the right to insist on this contract according to its terms, justly to enforce it. My contention is that this provision in this article makes it an international agreement capable of being enforced by the consent of the Government through the intervention of France.

Mr. PASCO. I recognized the fact, and I urged it this morning, that there can be no sale of this property to the United States except by and with the consent of the Colombian Government, and the first step in order to acquire a title to the Panama company would be through treaty negotiations and treaty arrangements made by the diplomatic authorities of the two countries.

Senator MORGAN. That is Colombia, of course; I am not speaking of that, I am simply speaking about France. Now, do you regard this *Universale Compagnie*, or whatever the name is, as a public or private corporation?

Mr. PASCO. It is a corporation organized under the general laws of France, the general corporation act.

Senator MORGAN. Is it what the lawyers know as a public or private corporation?

Mr. PASCO. It is to be exercised by private parties, and it is a private corporation. It has no governmental functions to perform.

Senator MORGAN. It has an international function, and it so declares in this contract, that it is an international corporation. Now, do you regard that as a public or a private corporation?

Mr. PASCO. I regard it as a private corporation, organized under the general incorporation laws of France, to carry out certain work in the country of Colombia.

Senator MORGAN. Then you take the ground that it is a private corporation.

Mr. PASCO. To a certain extent it is.

Senator MORGAN. Is there any extent to which it is not?

Mr. PASCO. I do not know of any public function that it has to perform.

Senator MORGAN. The law under which it is proclaimed is declared in these contracts to be a public statute. Does that effect your judgment in any way?

Mr. PASCO. The charter under which it is organized is based upon the general incorporation law of France.

Senator MORGAN. Do you understand that that takes from these contracts their international and public character?

Mr. PASCO. It is international to this extent, avoiding all the technical terms of law, to the extent that there is a foreign government which has an interest in its stock and that it obtains its authority to carry on its business in a foreign country by entering into a contract with the Government of that country.

Senator MORGAN. You have read Mr. Lampre's deposition carefully?

Mr. PASCO. I can not say that I have. I have looked it over; I have not read it carefully.

Senator MORGAN. I was going to ask you the question whether you agreed with him in his conclusions as to what was the state of the French law at the present time in reference to this transaction.

Mr. PASCO. I should rather you asked me specific questions, because I have not always agreed with those gentlemen on all of their points of law.

Senator MORGAN. I believe you said that the Commission had conferred with Mr. Lampre or some members of it?

Mr. PASCO. Yes, sir.

Senator MORGAN. Both before and after the last report was made?

Mr. PASCO. Both before and since.

Senator MORGAN. Did you take his opinions on the French law?

Mr. PASCO. I heard them from him; I could not accept them all; he talked about some of the matters of law, and I did not accept them all. I found that he was willing to advise his people to carry out our views with reference to the law. The first question with reference to law was discussed long ago, when we were having interviews with the former president of the company. He expressed the opinion then that the liquidators had absolute authority without any necessity of calling upon the courts to confirm their acts. That view I did not accept, but they are now acting in accordance with the judgment of the courts and propose to carry out the transaction with the authority of the courts and confirmation of their acts.

Senator MORGAN. Speaking of the deposits of certain papers with our ambassador at Paris, Mr. Lampre was asked:

"The CHAIRMAN. You spoke of the copy being left with the American ambassador in Paris?

"M. LAMPRE. Yes, sir.

"The CHAIRMAN. Was that left as an official paper?

"M. LAMPRE. Exactly; signed by the president of the board.

"The CHAIRMAN. Did the president of the company have the authority of the Government of France to deposit that official paper?

"M. LAMPRE. Not from the Government of France, but he has full authority from the stockholders' meeting, which was held on the 21st of December last. We had a stockholders' meeting then, and the stockholders' meeting approved of a resolution for the company to negotiate with the United States Government.

"The CHAIRMAN. I was speaking of the Government of France.

"M. LAMPRE. The Government of France has nothing to do with the question at all. We have a private company bound in no way whatever with the Government of France, only bound to act under the laws of the country, and the laws of the country are that whatever step a private corporation takes it is well and good when confirmed and approved of by the stockholders' meeting.

"The CHAIRMAN. Whatever they choose to do they can do if the stockholders' meeting approves it?

"M. LAMPRE. Quite so.

"The CHAIRMAN. That is your idea of the laws of France?

"M. LAMPRE. Exactly.

"The CHAIRMAN. There is no limit upon their powers except what the stockholders may choose to impose?

"M. LAMPRE. Exactly; unless, of course, they do something against the law, which is not the case."

I asked him to produce a copy of the charter, which he did. Do you concur in those views?

Mr. PASCO. I think he has got to comply with the general corporation laws of France. I do not think he can go outside of that. I do not think he means to go so far as to say otherwise; if he does, I could not agree with him.

Senator MORGAN. I did not ask you what your interpretation of what he says is. I shall reserve that right myself. I ask you whether you agree with him.

Mr. PASCO. I think their rights are limited by their charter and by the general law.

Senator MORGAN. And that the Government has no right to control it?

Mr. PASCO. Whatever right the Government of France has is executed through her laws. I do not think the French Government outside of her laws——

Senator MORGAN. Do you mean that the Parliament of France has no right to control this company?

Mr. PASCO. Oh, yes; they can change their laws; but these laws they are acting under were passed by the Parliament of France and approved by the proper authority. Within the powers given by those laws they can do anything.

Senator MORGAN. If there are such laws, they are passed by the Parliament of France and they are statute laws.

Mr. PASCO. Yes, sir.

Senator MORGAN. All the corporation laws of France are statute laws?

Mr. PASCO. Yes, sir.

Senator MORGAN. And they were afterwards repealed to a large extent as to this particular company. I further asked him as follows:

"The CHAIRMAN. Does that charter expressly authorize this company to sell its concession?

"M. LAMPRE. No; it does not.

“The CHAIRMAN. While that charter stays in force can this company sell its concessions without an act of the French Congress?

“M. LAMPRE. Quite so. Under the general laws of France the stockholders’ meeting is the only authority to investigate into the action of private corporations and to give them authority.

“The CHAIRMAN. Then a stockholders’ meeting can acquire by their act authority to dispose of their property to anybody without the consent of the Government?

“M. LAMPRE. That is quite the fact. The Government has nothing whatever to do with private corporations.”

Do you concur in that statement?

Mr. PASCO. I concur in the statement that they can sell without the express authority of the Government of France. They must exercise authority to sell under the laws of France and must exercise authority to sell in this particular case with the consent and agreement of the Republic of Colombia.

Senator MORGAN. Do you agree to the last proposition that he states there, that the stockholders’ meeting can acquire, by their act, authority to dispose of their property to anybody, without the consent of their Government?

Mr. PASCO. I say they can do it, provided they act in accordance with the laws of the Government, and those are set forth in the statutes and in the charter. It has been organized under the laws, and I do not think they can go beyond the laws.

Senator MORGAN. I read further:

“The CHAIRMAN. It is a surprising statement to me, at all events, as an American lawyer, that any corporation can exceed the bounds of its authority and can dispose of its entire property to any person anywhere, at any time, and for any consideration without the authority or assistance of any act of the legislature or the consent of the Government.

“M. LAMPRE. Nothing whatever of the kind is required. Corporations are quite free in France and independent of the Government. It has been so from the year 1867.”

Do you concur in that statement?

Mr. PASCO. I suppose he means that they can do it under their law. If he means that I am with him, and if he means they can go beyond the law under which the company was organized, beyond the powers of the charter, I am not with him.

Senator MORGAN. Do you concur in the statement that under the act of 1867 that he makes, which I suppose was a statute?

Mr. PASCO. Yes, sir.

Senator MORGAN. That this corporation had nothing whatever to do with the Government and that it is quite free and independent of the Government in its disposal of the property.

Mr. PASCO. I shall have to say again, Senator, that they must act within the scope of their authority as derived from the law and their charter; and then, again, they are embarrassed by two other things—they can not sell without the consent of Colombia, and the rights of the old company, which belong to the liquidator, must be protected. The liquidation is under the protection of the courts, and the liquidator can not, in my judgment, move a step unless the court authorizes him to act.

Senator MORGAN. I put this question to him:

“The CHAIRMAN. So that if this company is prohibited by the con-

cession from disposing of its property to the United States it can still do so under the laws of France?

"M. LAMPRE. It can absolutely, without any impediment whatever."

Mr. PASCO. I will repeat just what I said before; they can do it in compliance with the laws of France, provided the courts give the liquidator authority to dispose of the interests that he has in the property, and provided the Republic of Colombia waives its right to prohibit the transfer to a foreign government.

Senator MORGAN. Notwithstanding it is prohibited in the contract that it shall make a transfer of its property?

Mr. PASCO. The Colombian Government can waive that prohibition.

Senator MORGAN. I am talking about the laws of France. Has he the right, under the laws of France, to sell this property, notwithstanding it is prohibited in the concession on which the corporation is based?

Mr. PASCO. That can only be done by the removal of the prohibition.

Senator MORGAN. How can Colombia waive a prohibition as to the effect of the laws of France?

Mr. PASCO. The prohibition is a prohibition from Colombia; it is not a prohibition from France.

Senator MORGAN. Then you think with Mr. Lampre, that the laws of France have no effect upon it?

Mr. PASCO. I have not said that. I have said they must proceed under the laws of France and under the authority which they have in their charter.

Senator MORGAN. You hold to the doctrine, then, that corporations are quite free in France and independent of the Government, and that it has been so since 1867?

Mr. PASCO. They are independent of the direct action of the Government, but they are not independent of the laws which the Government has passed indicating how their affairs are to be managed.

Senator MORGAN. And not independent of the legislative control or authority?

Mr. PASCO. Oh, legislation can control corporations, of course Statutes can be changed, charter privileges can be withdrawn, and doubtless in France things can be done as in this country, and when a chartered company has rights, derived under the law, and its charter is made in accordance with it, it is independent of any direct control or interference on the part of the Government.

Senator MORGAN. Let me read further from Mr. Lampre's statement:

"The CHAIRMAN. Has the money ever been actually paid into the treasury or has it been left in the hands of the stockholders to be paid?

"M. LAMPRE. It has been actually paid.

"The CHAIRMAN. Do they get interest on it?

"M. LAMPRE. No.

"The CHAIRMAN. No stockholder gets interest?

"M. LAMPRE. No interest at all during the period of the construction of the canal. Of course they would after the canal is constructed and opened.

"The CHAIRMAN. Then would they get interest on it?

"M. LAMPRE. Yes; they would get 5 per cent.

"The CHAIRMAN. That is the agreement between your company and the stockholders?

“ M. LAMPRE. That is the by-laws.

“ The CHAIRMAN. That is, the new stockholders?

“ M. LAMPRE. Yes, sir.

“ The CHAIRMAN. After the company has completed the canal?

“ M. LAMPRE. Yes, sir.

“ The CHAIRMAN. The stockholders will get interest upon their subscriptions?

“ M. LAMPRE. Exactly; they would get interest upon the subscription and a dividend of the benefits.

“ The CHAIRMAN. How about the old stockholders?

“ M. LAMPRE. According to the charter the liquidation of the old company—I do not say the old stockholders, because legally they have no right to the benefits of the new company—— ”

Do you concur in that statement?

Mr. PASCO. Well, there is a peculiar arrangement under their charter. I wish you had the charter here, so that I could point it out to you, what it is.

Senator MORGAN. I have got it here; I have got a copy of it.

Mr. PASCO. There is a peculiar arrangement under which the stockholders of the new company get a benefit before this distribution of the 60 and 40 per cent, and if 5 per cent is made——

Senator KITTREDGE. You refer, I presume, to the definition of net profits?

Mr. PASCO. Yes, that is it. I will read:

“ ARTICLE 51. The annual proceeds of the undertaking shall be employed first to discharge:

“ First. The amount stipulated for their benefit by the Government of the United States of Colombia, by the terms of the law of concession.

“ Second. The costs of maintenance and exploitation; the costs of administration and all general expenses of the company; the interest and amortization of loans which may have been contracted.

“ Third. The deduction of one-twentieth part of the net profits, after payment of all the charges above enumerated, for the formation of the legal reserve fund.

“ Fourth. Five per cent of the capital stock, the proceeds of which shall be applied by the general assembly, according to the proposals of the council of administration, either for forming the amortization fund, which will be provided for in article 55 hereafter, or as interest on the shares not amortized.

“ ARTICLE 52. The surplus of the annual profits, after the various deductions arranged for under the preceding article, shall constitute the net profits of the enterprise.

“ Of these profits 5 per cent shall be deducted for the use of the council of administration of the company.

“ The surplus shall be applied as follows:

“ To the amount of 40 per cent for the shares created;

“ And to the amount of 60 per cent for the “ *Compagnie Universelle du Canal* ” in liquidation.

“ ARTICLE 53. Payment of interest and dividends shall be made at the company's office or with the representatives designated by the council of administration.

“ The payment of interest shall be made in two installments. On the 1st January and on the 1st July of each year.

"The dividends shall be paid the 1st January following the vote of the annual general assembly.

"However, the council may, if it deem it expedient, authorize the payment of an installment on the dividend on the 1st July preceding.

"ARTICLE 54. The interest and dividends which are not claimed at the expiration of five years after the date of payment shall revert to the company.

"ARTICLE 55. The amortization of shares shall take effect ninety-nine years after the commencement of the exploitation of the canal.

"Provision for this amortization shall be made by means of the deduction stipulated for above, in article 51, and the amount of which will be fixed by the general assembly at the proposal of the council of administration."

Senator MORGAN. So that they are to get an interest on their stock, and then if dividends are declared above that they are to get their pro rata of the dividend?

Mr. PASCO. Yes; they come in as preferred to the extent of the provisions referred to in the fourth paragraph of article 51; they get a preference before the final division is made.

Senator MORGAN. Mr. Lampre stated here that a receiver or liquidator had also been appointed for the bondholders.

Mr. PASCO. Yes; that is in one of those orders which have been made by the courts.

Senator MORGAN. What are the functions of that liquidator?

Mr. PASCO. I never understood that very clearly. I suppose he is, in a general way, to look after their interests.

Senator MORGAN. Does he hold the title to their bonds?

Mr. PASCO. I think he is simply a representative of them when matters come up before the courts.

Senator MORGAN. As an attorney?

Mr. PASCO. He is not designated as an attorney, but I think it would amount to that—an attorney or counsel.

Senator MORGAN. Is he any less the holder of the bonds than the liquidator is of the stock?

Mr. PASCO. That I am not clear upon. I understand that he has the power to speak for them and represent them when any matters come up before the court relating to the liquidation.

Senator MORGAN. You do not know, then, in making the contract for the sale of this property, whether that liquidator must join or not?

Mr. PASCO. I understand that he has no title in the property requiring him to join in it. When these orders are made by the court, he has the right to appear there and speak for the liquidator, but there is no title vesting in him, which makes it necessary for him to unite in making title to the property. He has no title to the property; it vests absolutely in the liquidator, of course in trust, and of course under the direction of the court.

Senator MORGAN. Under what law of France was he appointed?

Mr. PASCO. Under that special law; I suppose you have the date of it. I think I have the date of it on a memorandum in my pocket. It was that special act of July 1, 1893.

Senator MORGAN. You say you "suppose." You do not know how it is?

Mr. PASCO. That is what I understand about it.

Senator MORGAN. How do you get your understanding about it?

Mr. PASCO. From reading. I will not undertake to give all the contents of the law, but I refer to that law.

Senator MORGAN. You mean the law of 1893?

Mr. PASCO. The special act of July 1, 1893. There are three dates relating to the incorporation law which bears on this case. One is the general incorporation law passed in 1867, and then there was an amendatory act of August 1, 1893; but a little while before that, in July, 1893, this special act was passed with reference to this company.

Senator MORGAN. Has he any legal authority under the laws of France to represent and control the rights of the bondholders? Can he accept, for instance, for the bondholders, any sum of money in full discharge of their debts?

Mr. PASCO. I do not understand that he can at all; I understand that the court settles the rights of the parties. I do not think he has any power to do anything except that which the court authorizes him to do. The liquidator represents the rights, he holds the title to the property, and he must submit to the orders of the court. He can do nothing except what the court authorizes him to do. I understand his position is similar to that of an assignee in bankruptcy.

Senator MORGAN. If he represents all rights, he represents, then, the rights of the bondholders?

Mr. PASCO. I think so.

Senator MORGAN. What is the use, then, of having a liquidator for the bondholders?

Mr. PASCO. As I said before, it is not clear to me; it looks to me as though he was a sort of fifth wheel; but he has the right to speak for them and protect their interests.

Senator MORGAN. Have you ever consulted the statutes of France to see whatever authority he can have?

Mr. PASCO. You will find whatever authority he has in this act of 1893 that I referred to.

Senator MORGAN. Nowhere else you referred to?

Mr. PASCO. Nowhere else that I know of.

Senator MORGAN. He represents 800,000,000 of francs of bonds; he represents the bondholders in the United States.

Mr. PASCO. The first issue of bonds was for 600,000,000.

Senator MORGAN. I mean 600,000,000; and since then there has been an additional issue.

Mr. PASCO. I think so.

Senator MORGAN. Running it up to 800,000,000?

Mr. PASCO. I dare say; I would not say positively. It has not been essential in the examination of this case to determine what the indebtedness is, but the liquidator is the party that represents all interests.

Senator MORGAN. Now, he represents all the bondholders everywhere, then?

Mr. PASCO. I do not think it makes any difference where the bondholders reside.

Senator MORGAN. Well, it does not make any difference if he is a universal representative?

Mr. PASCO. Yes.

Senator MORGAN. And that you understand him to be?

Mr. PASCO. I take him to be clothed with authority from the court to represent them when any matter comes up in court with reference to questions relating to the bonds.

Senator MORGAN. And they are bound by his act?

Mr. PASCO. The court will make its decree accordingly, and they are bound by the act of the court. All he does is to represent them by presenting their interests.

Senator MORGAN. Your construction of the rights of the liquidator of the corporation is that he represents rights that the corporation and stockholders are bound by—that is, bound by his act?

Mr. PASCO. I understand that the liquidator represents all interests so far as holding the title is concerned and paying out any moneys that are received for the sales or use of the property.

Senator MORGAN. That the whole title of the property is vested in him, belonging to the corporation, and also the interest of the stockholders; they are vested in him.

Mr. PASCO. I understand he has about the same interest and the same right and the same title that an assignee in bankruptcy would have.

Senator MORGAN. The question is: Can you cite to any law of France that gives this power; can you give the committee the benefit of investigation on that subject?

Mr. PASCO. I cite the law that relates to the matter.

Senator MORGAN. Do you rely wholly on this act of 1893?

Mr. PASCO. That and the general incorporation laws of France.

Senator MORGAN. That is what I am trying to find out about.

Mr. PASCO. If you will look in our reports, you will see that we have referred to the volumes where they can be found.

Senator MORGAN. Well, we can not get at that readily just now. The books are here in the library, and if you will give us the citations we will get them.

Mr. PASCO. I can not do it, unless you can get me the volume of appendices in which are cited all of the cases and authorities when the report was prepared.

Senator MORGAN. I want to get what I can about this act of 1893.

Mr. PASCO. I think I sent you a copy of that a few weeks ago.

Senator MORGAN. There is a copy of that furnished by Mr. Lampre in his deposition.

Mr. PASCO. I think I sent you a copy before that.

Senator MORGAN. Maybe so; I think you did, yesterday. I notice in article 2, at the conclusion of the second clause, the following:

“In case there should arise a divergence or opposition of interests between the different classes of bondholders, one or more special attorneys may be appointed in the manner and form just above provided for. The powers of the attorneys aforesaid may be revoked at the same request and in the same manner. There shall be no appeal from said orders or decrees.”

That is the statute of 1893. Did that change the law of France?

Mr. PASCO. Well, I don't know that there was anything specially upon that subject before. This was a peculiar case, involving large interests, and it was regarded as requiring special legislation to reach some matters that the general incorporation law of France did not cover, and these special provisions were enacted so as to clothe the court and its officers and appointees with sufficient authority to perform all the functions that would be needed in the settlement of this company's affairs.

Senator MORGAN. You, then, regard this a special act for the pur-

pose of getting that company out of its difficulties in consequence of failure by the Government of France?

Mr. PASCO. The law was enacted to cover such provisions as the general laws did not cover and to give such additional authority to the court and officials as would enable them to deal with this case.

Senator KITTREDGE. You refer now to the special act of the French Parliament of July 1, 1893?

Mr. PASCO. Yes.

Senator MORGAN. Was this law enacted as an amendment to the general laws of France for the special purpose of taking charge of this company and having its affairs administered?

Mr. PASCO. I understand it was a special act.

Senator MORGAN. What I have read is one of its provisions.

Senator KITTREDGE. The act amending the general incorporation law was the act of August, 1893?

Mr. PASCO. Yes; that was passed the following month.

Senator MORGAN. In article 10 of this statute, under the head of "Receiver," I find the following:

"ART. 10. All acts tending to alienate any assets of the company, all contracts entailing a transfer or contribution of the whole or of a part of the assets of the concern, emanating from the receiver of the Universal Company of the Panama Interoceanic Canal, shall be subject to the approval or ratification of the Civil Tribunal of the Seine, who shall, on the report of one of the justices, pass on the question in open court."

You spoke about some such judgment having been made. Have you ever seen it?

Mr. PASCO. There was a judgment authorizing the receiver to contribute the property of the old company to the new company, and then all parties had an opportunity afterwards to go into court and intervene, representing the various interests.

Senator MORGAN. But that judgment was long before the date of this act—the judgment authorizing the liquidator to transfer the property to the new company—it was long before the date of this act?

Mr. PASCO. The charter was in October, 1894, and the judgment of the Tribunal of the Seine authorizing the transfer of the property in that way was June 29, 1894; so it was subsequent; and then all the parties had an opportunity to come into court and intervene; and there was a confirmatory order made August 8, 1894.

Senator MORGAN. Then I was mistaken about that point. The point that I had in mind was this: That that order of court authorizing the transfer of property by the liquidator from the old company to the new was before any offer was made.

Mr. PASCO. Oh, yes.

Senator MORGAN. To sell this property for forty millions of dollars.

Mr. PASCO. But they went to work under that and tried to complete the canal under the charter as it was made.

Senator MORGAN. So that there would have to be judicial proceeding taken upon notice and application for the purpose of disposing, or of doing any act tending to dispose, of any of the property or rights of this old canal company?

Mr. PASCO. That was done; and we have a copy of that order in the appendixes. There was also a confirmatory order, which I had not been able to get hold of at the time that we completed our report, and it is not among the appendixes.

Senator MORGAN. What do you mean by the "confirmatory order?"

Mr. PASCO. The confirmatory order made August 8, 1894. The parties had an opportunity to intervene—confirming the contribution, as they term it, and, as we should say, the transfer of the property.

Senator MORGAN. That was an order confirming the transfer of the property to the new company?

Mr. PASCO. Yes, sir.

Senator MORGAN. And not an order authorizing the old company to sell?

Mr. PASCO. No, sir; that was later.

Senator MORGAN. When was that?

Mr. PASCO. That was quite a recent order.

Senator MORGAN. What was the date of it?

Mr. PASCO. It is only a short time ago—August 2, 1901.

Senator MORGAN. But that was before the proposition to sell for \$40,000,000 was made?

Mr. PASCO. Yes, sir.

Senator MORGAN. That offer was not made until what date?

Mr. PASCO. I think it was January of the present year, 1902.

Senator MORGAN. And then it was made by cablegram?

Mr. PASCO. Yes; first made by cablegram.

Senator MORGAN. Now, I will read article 11:

"ART. 11. All decrees of approval or ratification rendered in accordance with the preceding article shall be published, within a term of ten days, in the Journal Officiel and in the Journal Officiel (Commune edition).

"This decree may be attacked by a third party, by the shareholders, by the attorney of obligation holders, and by other creditors of the company, within a delay not exceeding one month from the date of the publication aforesaid. The civil tribunal shall adjudicate the question within the space of one month, as in the case of matters demanding an immediate and summary adjudication. The appeal from such decision must be entered within ten days from the time of notification of said judgement to the party in person or at his domicile."

Mr. PASCO. That is a person, I understand, called a receiver for the bondholders.

Senator MORGAN. I understand. Now, there is a time given for the attack of such a decree as that. That is a decree to alienate any part of the property?

Mr. PASCO. Yes, sir. Now, then, that opportunity was given under the transfer of this property to the new company, and all these parties who intervened were heard, and after they were all heard the transfer or the contribution was approved by the court.

Senator KITTREDGE. In what manner was that opportunity given for hearing?

Mr. PASCO. That law was followed by giving notice, I presume. They were all there before the court. It states all of the different parties represented in the body of the order.

Senator MORGAN. Do you know about it? You say you "presume."

Mr. PASCO. I know the court found they were all there.

Senator KITTREDGE. Has your attention been called to the publication of notice for this application for contribution—the sale to the new company?

Mr. PASCO. We were speaking then of the old order.

Senator KITTREDGE. I am referring to that also.

Mr. PASCO. I can not say that I have seen the notice, but the court found that all the parties were present before it. I understand that the notice was given. When I find in the body of an order that the court finds that all the parties are before it, I do not always look back to see whether proper notice was given to them. I take it for granted in the same way in this case.

Senator MORGAN. As I understand you, certain of the interested parties did in fact appear, objecting to the confirmation of the sale of the property of the old company to the new company?

Mr. PASCO. Some objecting and urging that it would have been proper for the old company to go on and raise the funds to complete the canal, and others dissenting for other reasons; but they were all heard and their arguments were listened to and the court made its confirmatory decree after listening to the arguments.

Senator MORGAN. And that was of date 1894?

Mr. PASCO. Yes; August 8, 1894.

Senator MORGAN. What method was employed, if any, to notify the nonresident bondholders, those residing in the United States?

Mr. PASCO. I suppose notice to——

Senator MORGAN. I want to know if you know anything about it?

Mr. PASCO. The officer appointed by the court to represent them was there before the court presenting his case, and when the attorney is there, of course the parties are there.

Senator MORGAN. So that if there were bondholders in America, they were represented by an officer appointed by the court, and that officer conducts the transaction without any personal notice to them at all.

Mr. PASCO. This notice to their representative was notice to the person, so they all had notice through him.

Senator MORGAN. He was their representative appointed by the court and they had nothing to say about it?

Mr. PASCO. A guardian ad litem appointed by the court represents the infant.

Senator MORGAN. Yes, but not grown-up people.

Mr. PASCO. Or a married woman.

Senator MORGAN. Yes; but not a single woman.

Mr. PASCO. And the laws of France seem to recognize the right to appoint this officer under the law to represent these parties.

Senator MORGAN. You say they "seem" to. I will ask you the question, do they and do you know it?

Mr. PASCO. I have submitted the law to you.

Senator KITTREDGE. Under the law of France, is not a receiver or a liquidator regarded in substantially the same light as an infant, and notice to the public official given for that reason?

Mr. PASCO. And in the same light that an assignee in bankruptcy is under our laws.

Senator MORGAN. I should like very much to have the laws of France cited to the committee so that we could form our conclusions about it without taking the opinion of one of the Commission, and if you have any knowledge of any such laws, will you be good enough to cite them to the committee?

Mr. PASCO. If the committee desires me to make a brief citing all these points, I am willing to do it.

Senator MORGAN. I should be very glad to have you do it. I don't want to do any injustice to your opinion.

Mr. PASCO. It must be evident that in a hasty examination like this I can not always put my fingers on a particular paragraph where the law can be found when I have made no special preparation to meet all the points that are presented.

Senator MORGAN. In article 11 there is this provision:

"The appeal from such decision must be entered within ten days from the time of notification of said judgment to the party in person or at his domicile."

That is not the liquidator or representative in court?

Mr. PASCO. There was no appeal taken.

Senator MORGAN. Well, was there any notice given "ten days from the time of notification of said judgment to the party in person or at his domicile?" That must mean the bondholders.

Mr. PASCO. I should say it was the domicile of the party who represented them. If he was before the court, he must have had knowledge of final judgment.

Senator MORGAN. I read from article 12:

"ART. 12. The Universal Company of the Panama Interoceanic Canal, the civil, i. e., nontrading, company formed for the purpose of redeeming the obligations or bonds of the Panama Canal (issue of March, 1888), and the civil or nontrading company for the redemption of the lottery bonds of the Panama Canal, are hereby exempted from the payment of all stamp duties and of all transfer or transmission taxes now due or about to become due on any shares, obligations or bonds of the said companies."

What is this company, the nontrading company, formed for the purpose of redeeming the bonds of the Panama Canal Company of issue March, 1888?

Mr. PASCO. It seems to be an auxiliary company that was organized in connection with these lottery bonds.

Senator MORGAN. In the lottery bonds, that is an additional thing. This is a company formed for the purpose of redeeming the obligations or bonds of the Panama Canal Company.

Mr. PASCO. Well, then, I will leave out the word "lottery."

Senator MORGAN. Well, the next clause refers to the lottery, but it is a separate company.

Mr. PASCO. Suppose you read it all again and I will be able to answer it better.

Senator MORGAN read the clause again.

There are three companies there, the old company, the Universal Company and the company for the redemption of the Panama Canal bonds, and the company for the redemption of the lottery bonds. They are all exempt from paying stamp duty. Now, I want to know what is that company for the redemption of the Panama bonds?

Mr. PASCO. So far as I have been able to find out—I have never investigated that part of it—it seems to be a sort of auxiliary organization to perform duties in connection with these bonds.

Senator HAWLEY. To get at the saving fund, isn't it?

Mr. PASCO. Yes; a fund was set apart for the payment of these bonds and these companies have got the control of that fund.

Senator MORGAN. Did you ascertain anything about what rights they had or what property they had in their possession?

Mr. PASCO. I had not thought it was pertinent to this case.

Senator MORGAN. There were assets of the old company that did not pass to the new company?

Mr. PASCO. Oh, yes.

Senator MORGAN. How much?

Mr. PASCO. I can not tell that. I know that the liquidator contributed largely to the stock of the new company. The liquidator paid 15,895,000 francs into the stock of the new company, but there were assets of the old company that did not pass at all to the new company.

Senator MORGAN. Well, the 15,895,000 francs subscribed by this institution, this company, was really the property of the old company.

Mr. PASCO. Well, it was in the hands of the liquidator of the old company, so of course to that extent the creditors and stockholders of the old company have got an interest in the stock of the new company.

Senator MORGAN. Now, about the lottery company. I am somewhat interested about the lottery company, because we have had some correspondence here about that feature.

Mr. PASCO. I have not thought it was pertinent to this inquiry, because the holders of the lottery bonds are not connected with this subject, except so far as they are creditors of the old company, and if they are creditors of the old company, they are represented by the liquidator.

Senator MORGAN. Well, there are some of those holders of those lottery bonds in the United States.

Mr. PASCO. Yes?

Senator MORGAN. I would like to know what you know about it.

Mr. PASCO. Well, I know very little about it. I know there is a fund set apart for those people.

Senator MORGAN. Do you know anything about the scheme, the lottery scheme; how it is managed?

Mr. PASCO. I don't know enough about it to give a full explanation of it.

Senator MORGAN. You don't know whether they have got a lien or right in the new corporation or not?

Mr. PASCO. They have got no lien upon this property, upon the property of the old company.

Senator MORGAN. How do you ascertain that, if you have not inquired into it?

Mr. PASCO. Well, the title that was made of the property transferred to the new company was transferred without any obligations of that sort.

Senator MORGAN. Have you seen a transfer of it that said it was free from all obligations?

Mr. PASCO. You can examine the charter, and you will see it was all transferred in that way. There is no obligation mentioned. The liquidator represents all the creditors and bondholders. There is no authority for mortgage security in the law authorizing the issue of the bonds. There is no authority that makes the bonded indebtedness a lien upon any property of the old company.

Senator MORGAN. Does the liquidator represent this company for the redemption of the Panama Canal bonds?

Mr. PASCO. The liquidator represents him in the sense that he represents all of the creditors and all of the stockholders, but the bondholder is not a preferred creditor; he is not a lien holder. I can say

that these lottery bonds and these other bonds are not secured by any mortgage upon the company's interests.

Senator MORGAN. How do you know that if you have never inquired into it?

Mr. PASCO. I know enough from reading the law to know that.

Senator MORGAN. The general provisions of the law?

Mr. PASCO. Yes; I know enough about reading the law relating to these bonds. They are not mortgage bonds; they are simply spoken of in the law as bonds.

Senator MORGAN. What law do you refer to?

Mr. PASCO. The statutes of France relating to the matter.

Senator MORGAN. Of what date?

Mr. PASCO. I can not give you the date of them. I can get all of these facts for you if you wish to pursue this inquiry.

Senator MORGAN. I want every one of them; they are very important.

Mr. PASCO. All I can say with reference to it is that these bonds are not mortgage bonds, they are not liens upon this property, and that the liquidator represents the creditors of the company as well as the stockholders.

Senator MORGAN. Now, the General Assembly of France, in article 12 of this law that you have quoted, separates between the liquidator of the old company and the company for the purpose of relieving the obligations of the Panama Canal Company, the bonds, and the company for the redemption of the lottery bonds, treats them singly as if they were different entities and had different rights and obligations. How can it be said that the liquidator of the old company represents the other two companies under the law of France?

Mr. PASCO. It represents all the creditors of the company.

Senator MORGAN. Is there any later law than this that gives him the right to represent them?

Mr. PASCO. The order appointing him puts him in charge of all of the assets of the company.

Senator MORGAN. I am not speaking about the order of the courts; I am speaking about the law. I want to know whether the law confers upon him—

Mr. PASCO. I have referred you to all the laws that relate to the subject. They are the general incorporation laws, the amendatory act, and the special act of July 1, 1893. Those are the laws that relate to the company and that give the authority to the court for winding up its affairs. It was put in liquidation and the affairs of the company are being wound up in this proceeding.

Senator MORGAN. Referring to the right of the people in France, or the people in Colombia, or the people in the United States who hold obligations of this old Panama Canal Company, bonds, or the interest-bearing stock, I want to call your attention to article 13:

"ART. 13. Beginning with the date of the promulgation of the present law no limitation in bar of actions in damages shall begin to run against the creditors of the Panama Canal Universal Company until the balance remaining to the credit of the company shall have been realized on and entirely distributed."

Have they not got the right now? Are they barred by any statute of limitation from bringing suit?

Mr. PASCO. They have a right to present their claim to the court that is winding up the affairs of the company, the court that has con-

trol of the liquidation, as in the bankrupt court of the United States. That is the place to go to present their claims.

Senator MORGAN. Suppose it is not, have they not all got the right preserved by this section of the statute until the company has been finally wound up and entirely——

Mr. PASCO. There is no contest about their right that I know of to present their claims.

Senator MORGAN. I want to know whether they have got a right to involve that company now in litigation, and if the company has been wound up and its assets realized upon and entirely distributed.

Mr. PASCO. Well, the distribution of the assets of the company and of the proceeds of their property will be made by the courts. All the creditors will have an opportunity to present their claims.

Senator MORGAN. When will that distribution be made?

Mr. PASCO. Whenever the courts see fit to make it; whenever the time has come to make it under the laws of France and under the rights of the parties.

Senator MORGAN. It has not been made?

Mr. PASCO. I understand it has not.

Senator MORGAN. You don't know when it will be made?

Mr. PASCO. I know that as late as August 2, 1901, there was an order made by the court. The court is still making its orders relating to the property. The court has not made its final decree, and all the parties interested in the assets of the company can go into court at the proper time and present their claims, and in any distribution that is made they will get whatever the court considers them entitled to.

Senator MORGAN. It seems to be very plain here that no bar of actions for damages shall begin to run against the creditors of the Canal Universal Company until the balance remaining to the creditors of the company shall have been realized on and entirely distributed. That may be five years or ten years from now, and yet, after that, have not these people a right to go in and bring an action in the French courts for the recovery of these rights? Now, section 14 I will read to you:

“ART. 14. Shareholders, subscribers, or buyers of stock having acquired title to the same before the company was placed into the hands of a receiver, provided they represent at least one-twentieth of the capital stock, may join a common interest and intrust one or more attorneys or representatives with maintaining any action and with representing them in court.”

Mr. PASCO. That is only pointing out a way in which this company can be wound up.

Senator MORGAN. That may be so, but when does the statute of limitations run against their rights—when are they absolutely barred?

Mr. PASCO. Their rights are against the liquidator, they can not follow the property after it has been sold—any property after it has been sold under an order of the court; it matters not how long a time they have for the settlement of their rights and claims. When a property has been sold under a decree of the court which has jurisdiction of the entire subject-matter, it can not be reached again by the creditor.

Senator KITTREDGE. They can only litigate regarding the proceeds?

Mr. PASCO. They can only litigate with regard to the proceeds. The proceeds will be placed in the registry of the court, and what-

ever litigation there is is over the proceeds, not of the property, as in judicial sales in this country. If, on proper showing, the court authorized the sale of this canal property in which the liquidator of the old company has an interest—if this canal property is sold, and it is sold by the company and by the liquidator, a liquidator acting under the order of the court and selling whatever interest the old company has in it, then the proceeds of the property or interests of that company are placed in the registry of the court, and the title to it is good. Now, then, the creditors of the company can quarrel over the proceeds as much as they please, but the title to the property, after a legal judicial sale, confirmed by the order of the court, is not affected by any quarrel or contest over the proceeds.

The CHAIRMAN. I think in general I agree with you about that principle of law that you announced, but before the sale is finally promulgated by the court could not the creditors and the stockholders come in and object to the sale?

Mr. PASCO. I think I stated this morning that in my judgment they could object to it.

The CHAIRMAN. And on objecting to the sale they will then be heard by the court, and the matter of their objections heard, and judgment will be rendered, and if they are dissatisfied with the judgment then they can appeal to the higher tribunal?

Mr. PASCO. Yes.

The CHAIRMAN. And then if that tribunal confirms the judgment of the lower court, why then the sale will proceed and the discussion will then take place between the creditors of the old concern and the stockholders as to the distribution of the proceeds.

Mr. PASCO. Yes; this order of August 2, 1901, is absolute in its character, but still it does not fix any price, and although others differ with me, my judgment is that it would be necessary to present the whole matter to the court just as a master in chancery would in our country after a judicial sale, and submit the action taken for confirmation, stating that the sale has been made and that the price is to be so many dollars and the court then will hear all parties that are interested—of course they are all within reach—because it is a proceeding in liquidation of an estate, and then the court will make its decree confirming the sale or refusing to confirm if the sale is found to be objectionable from any just cause.

Senator KITTREDGE. And this application will be made in the old insolvency proceedings?

Mr. PASCO. In the old insolvency proceedings. Now, as I said this morning, this Commission, appointed by the Government of the United States, has said that property is worth \$40,000,000 and the new company says that is a fair price, and, as far as it is concerned, it has agreed to take it. The liquidator has investigated the matter, and he agreed to take \$40,000,000, and he is acting under the order of the court, and he agrees that the property shall be sold for \$40,000,000; that he will take for the interests that he represents his proper share and portion of that \$40,000,000. So that there is every reason to believe that upon such a presentation the court would justify the sale and confirm it, but still it might be rejected.

Senator MORGAN. Now, the report in favor of this proposition to sell for \$40,000,000 is predicated not upon what the court has done, but upon what you expect it will do?

Mr. PASCO. It is predicated on the basis of the fact that that is a fair and just valuation of the property.

Senator MORGAN. Is it predicated upon what has been done by the court or upon what you expect to be done?

Mr. PASCO. That hardly needs an answer. The confirmation of sale will depend upon the proceedings before the courts, a part of the proceeding having already been conducted.

Senator MORGAN. What part of it?

Mr. PASCO. The order authorizing the liquidator to sell.

Senator MORGAN. At what price?

Mr. PASCO. No price fixed.

Senator MORGAN. Of what property?

Mr. PASCO. The interest of the liquidation in the property of the new company. The liquidator must join with the New Panama Canal Company in selling its property. He has been authorized to do this.

Senator MORGAN. Can that be made without notice to the bondholders and the creditors?

Mr. PASCO. I think it can without a special notice.

Senator MORGAN. Well, special or general notice. I mean a notice which authorizes a man to come in and controvert an order which ought to be sold or not. Has any notice of that sort been given to the bondholders and the stockholders?

Mr. PASCO. I presume that everything that is required by the law of France has been done.

Senator MORGAN. We are not here for the purpose of getting your presumption. I want to know the facts. You are a lawyer, and you understand my question.

Mr. PASCO. I take it for granted that when the court of France has made an order, that it acted correctly and had the proper authority before it before making it.

Senator MORGAN. I do not. I take it for granted the other way, judging from the arbitrary manner in which they have proceeded in this whole business. I take it for granted that a few of the interested parties may be called there, but that the bondholders and the stockholders, especially the nonresident bondholders, have had no notice whatsoever. Now, I will be obliged to you if you will give any statement of facts——

Mr. PASCO. I have no copy of the notice or of a proof of notice.

Senator MORGAN. Have you investigated to see whether it is so or not?

Mr. PASCO. I understand it is so.

Senator MORGAN. Have you investigated it?

Mr. PASCO. No, sir; I have not been in France to investigate it. I would not take any title that I had not investigated myself when the time comes to pass the title.

Senator MORGAN. Now, when we are trying to get at the facts, we do not want hearsay, we do not want understandings. I want to know if you know as a matter of investigations that that notice was ever given?

Mr. PASCO. So far as I have had opportunity to investigate and know, it has been.

Senator MORGAN. Have you had an opportunity to investigate?

Mr. PASCO. Well, not very much.

Senator MORGAN. Well, how much have you had?

Mr. PASCO. I would be governed a great deal at this preliminary stage by the fact that the order was made by the French court, and that I presume it is a correct judicial order.

Senator MORGAN. Are you not governed entirely by that?

Mr. PASCO. No, sir.

Senator MORGAN. What else is there to govern you besides this?

Mr. PASCO. Well, only by conversation with the witness whom you have had here before you, Mr. Lampre.

Senator MORGAN. We have got his testimony here.

Mr. PASCO. Well, then you can be governed by that and mine.

Senator MORGAN. Does he speak of any notice having been given?

Mr. PASCO. I don't remember; you are more familiar with the testimony than I am.

Senator MORGAN. Is that all you know about it—about the legal situation in that regard there in France? Have you told all that you know about it?

Mr. PASCO. I present the order; at least, I refer to the order for what it is worth, and I have told you all that I know about it. Of course, if it is a void order, it amounts to nothing; if all of these proceedings are void, they count for nothing; but in passing the title the time for making an examination of all the details will come later. We are not now finally passing the title; we are telling a way in which title can be passed.

The CHAIRMAN. There is one question which I would like to ask you now. The committee is trying to ascertain as far as it can, not only the relative merits and the practicability of the difference of the of the isthmian routes, but this special committee is trying to secure all the information it can as to the legal difficulties, if there be any, of obtaining a good and valid title on the part of this Government, not only to the property rights and privileges belonging to the new company, the New Panama Canal Company, of which they acquired from the old Panama Canal Company, but also the legal difficulties in the way of securing concessions from the Colombian Government by which the control and maintenance and ownership of this canal will be in this Government. Now, will you just succinctly and briefly as you can state what, in your judgment, those legal difficulties are, and how those legal difficulties can be overcome in the event that this route shall be finally adopted by this or any other Congress?

Mr. PASCO. Well, they can only be overcome——

The CHAIRMAN. State, please, what are the legal difficulties, in your opinion, and then how they can be overcome?

Mr. PASCO. I do not exactly understand.

The CHAIRMAN. What are the legal problems that will have to be met in order for this Government to obtain the control, management, and ownership of the canal built across the Isthmus of Panama?

Mr. PASCO. Well, we shall need a strip of territory through there.

The CHAIRMAN. I do not mean the physical difficulties, but the legal difficulties now standing in the way.

Mr. PASCO. The consent of the Government of Colombia is all that is necessary to give the United States the right, after the obstacles are removed in the way of French ownership and French rights; the consent of the Colombian Government is all that would be necessary, and the differences as to details must be worked out by treaty negotiations.

The CHAIRMAN. Do you understand that all the details of that can

be worked out by treaty negotiations, or will it be necessary for the Congress of Colombia to take any action in the matter?

Mr. PASCO. Their Congress has to ratify a treaty, as I understand it, just the same as the United States Senate would have to ratify it on the part of the United States.

Senator KITTREDGE. Now, in regard to the other case—Nicaragua and Costa Rica?

Mr. PASCO. There will be the same requirements there. You can not enter either of these countries until a treaty has been made.

Senator MORGAN. You were before this committee in May of 1900, and on that occasion speaking of the uncollected balance due to the old company from France, as follows:

“The CHAIRMAN. They probably collected unpaid balances of stock in France.

“Colonel ERNST. I understand there were some unpaid balances that that receiver did get hold of.

“The CHAIRMAN. Yes; that is where the money came from, a large part of it. Now, I will read Subdivision XIV, on page 31:

“‘XIV. The security holders of the old company have no vote, voice, title, or ownership in the property of the new company or in the administration of its affairs. By private contract merely the new company has agreed that after all expenses of operation, maintenance, exploitation, dividends, reserve funds, etc., are provided for, a specified share of the surplus income shall be paid to the liquidator of the old company for the benefit of his constituents; but this agreement has no effect upon or relation to the absolute ownership and administration of the canal by the new company.’

“That is to say, they have got the legal title and hold it in trust.

“Mr. PASCO. Mr. Chairman, although that is stated to be a private contract, it was a part of the terms upon which the new company was organized; and they were bound under that contract to pay this amount out, so that the old company still has this interest in the control of assets and profits of the new company.

“The CHAIRMAN. That is all. I wanted to ask you, Mr. Pasco.

“Mr. PASCO. So that this interest still exists in the old company to that extent, whether it may be worth little or much.

“The CHAIRMAN. And it was upon that predicate that this court went on and appointed a manager here, when the former board resigned.

“Mr. PASCO. At a subsequent date?

“The CHAIRMAN. Yes; on January 6, 1900.

“Mr. PASCO. They took the bargain with that burden, and of course it is still upon them.”

Do you still adhere to that opinion?

Mr. PASCO. Yes; that with reference to the necessity of the liquidators joining in the sale is in harmony with all that I have said to-day. The property of the old company was contributed, as they term it, to the new company, and the liquidator was to receive, as consideration for that, 60 per cent of the net income, and that I have always maintained created a continued interest in the new company on the part of the old company. At one time it was not looked at in that way by the representatives of the new Panama Canal Company, but it is now, and it is for that very reason that the liquidator is to join in the sale and the transfer of this property and a good title can not be made without that. That was the substance of what I said then and I say it now. He has authority to protect that interest too.

Senator MORGAN. That was a statement of your opinion, that under the arrangements which had been made the stockholders and the bondholders of the old company had an interest in the assets and property of the new company.

Mr. PASCO. Through the liquidator; yes, sir.

Senator MORGAN. Yes, but that they had the interest?

Mr. PASCO. Yes, and I still think it. That is the reason why he must join in the title.

Senator MORGAN. Suppose that he should turn traitor and sell out for a part of its value, could they not restrain him?

Mr. PASCO. I should think the court would refuse to confirm the sale.

Senator MORGAN. Is he not merely a go-between, and are not these other people—the stockholders and the bondholders—the real men interested?

Mr. PASCO. The property was vested in him and he transferred it.

Senator MORGAN. We understand about the legal technicality, but I am going beyond the legal technicality in the real merits of the case. In fact and in law are not these men represented by him the real owners of the property, the stockholders and the bondholders. Did not they pay the money for it?

Mr. PASCO. They have got an interest which the court has appointed him to protect, and if he fails to discharge his duties or turns traitor to them, as you suggest, the court has the means of controlling him and he can not pass a title without the consent of the court.

Senator MORGAN. Do you hold his naked legal title by appointment of the court, without notice to them, rides down their equities and interests in this property so that they can not be protected by any other tribunal?

Mr. PASCO. Nobody ever claimed that.

Senator KITTREDGE. The liquidator is simply the agent of the court?

Mr. PASCO. Yes, sir.

Senator MORGAN. He is a mere agent or trustee, without any interest whatever in the property except his fees?

Mr. PASCO. But he is powerless without the voice of the court to confirm his act.

Senator MORGAN. Did you ascertain in your investigations of this matter how it was that the liquidator became a stockholder in the new company and represented these people as a stockholder in the new company?

Mr. PASCO. I understand that he did contribute. Here is a list of the contributors on page 84 of the report.

Senator KITTREDGE. Was not that contribution authorized by the special act of July 1, 1893?

Senator MORGAN. No, sir; it is not. Here is the act, and there is nothing of that sort in it.

Senator KITTREDGE. Permitting the liquidator to become a stockholder.

Senator MORGAN. No, sir; I can not find anything of that kind in it.

Mr. PASCO. I know, as a matter of fact, that he became a stockholder, and that he attends the stockholders' meetings and votes that stock.

Senator MORGAN. Not only he became a stockholder, but other men became stockholders who were indebted to the old company.

Mr. PASCO. Yes, I have heard it suggested—you do not want hear-

say here—but it is generally stated and believed that some of those people who had profited unjustly by the affairs of the old company compromised claims against them by taking stock in the new.

Senator MORGAN. Got out of their troubles in the old company by taking stock in the new?

Mr. PASCO. Yes; contributed some of their savings and profits.

Senator MORGAN. Suppose this liquidator had authority to subscribe stock in the new company, whose money did he represent—whose stock did he subscribe?

Mr. PASCO. He represented the money that was a part of the assets of the old company.

Senator MORGAN. And that came from the funds that had been subscribed or paid in there for stock or bonds by the bondholders and stockholders of the old company?

Mr. PASCO. Yes, sir.

Senator MORGAN. So he took their money and subscribed it in this new company?

Mr. PASCO. So it seems.

Senator MORGAN. Do you know of any authority that he had in law or in fact to do that. Can you point to the law that authorized him to do that?

Mr. PASCO. I can not at this moment.

Senator MORGAN. Well, if you can, I hope you will, because I want to know about that law. It looks to me as a startling proposition that a liquidator or a receiver can take the money that belongs to the company, the stockholders, and the bondholders, and subscribe it for stock in the new company. I can not understand that. French law may give them that power, but if it does it is a very queer law. I have no further questions to ask this evening.

The committee then, at 4.30 p. m., adjourned the further hearing of the statement of Mr. Pasco until Saturday, February 15, at 3 o'clock p. m.

WASHINGTON, D. C., *Saturday, February 15, 1902.*

The subcommittee met at 3 o'clock p. m.

Present: Senators Foster, of Louisiana (chairman), Morgan, Kittredge, and Hawley.

ADDITIONAL STATEMENT OF HON. SAMUEL PASCO.

Senator KITTREDGE. When was the old Panama Company organized?

Mr. PASCO. I am not sure that I can give you the exact date.

Senator KITTREDGE. About when was it?

Mr. PASCO. I think it was about 1880 or 1881.

Senator KITTREDGE. Have you a copy of its charter or articles of incorporation?

Mr. PASCO. I have not a copy of the written charter.

Senator KITTREDGE. Under what law was it organized?

Mr. PASCO. Under the general incorporation laws of France.

Senator MORGAN. It was organized in 1886.

Mr. PASCO. The first general meeting of the company was in January, 1881, but probably they organized formally earlier than that. It was put down as 1881 in our report, but General Ernst did not quiet

agree with me as to the date. I fixed it from the best authority that I could get, and that was a volume published by J. C. Rodrigues, which states that their first meeting was held in 1881. Wyse entered into his first contract with Colombia in May, 1876.

Senator MORGAN. May, 1878, was it not?

Mr. PASCO. It was modified in 1878, and that took the place of the 1876 contract, which restricted the concession to the southeastern part of Darien. The general route of the proposed canal was to be determined by an international congress of engineers, to be determined not later than 1881.

I read from the report of the commission: "This concession was transferred to La Compagnie Universelle du Canal Interoceanique de Panama, better known in the United States as the Panama Canal Company, which was organized early in 1881 to construct a sea-level canal by the proposed route."

From the best information within my reach I have fixed that as the date. General Ernst thinks it was earlier than that, but he was not able to get hold of the exact date. I will say in or about 1881.

Senator KITTREDGE. Do you know where we can secure, if it shall become necessary, a copy of the charter or statute, as they call it in France, of the old company?

Mr. PASCO. I have not been able to get hold of one, although I have tried, during the last few days. We have got nearly everything in some form or other in our commission relating to canal matter, but that is one of the few things we never obtained. I will endeavor to get hold of it. I think perhaps if I make some research in the Congressional Library I may find it. Since I was last before this committee I have been giving it special attention, but have not got hold of it.

Senator KITTREDGE. It was organized under the general incorporation laws of France of 1876.

Mr. PASCO. Yes, the law of the 24th of July, 1867. I was going to bring the volume that contains that general incorporation law, but I found it was charged to Senator Morgan in the Congressional Library.

Senator MORGAN. I have got it here.

Mr. PASCO. It is translated in that volume. I will say it is referred to in our appendices. In one of the appendices, KK, we give all of these laws and the orders of court that were before us, and the reference to these charter laws is given in the first part of that appendix.

Senator KITTREDGE. What kind of a corporation was the old Panama company, civil or commercial?

Mr. PASCO. Well, that was a matter of controversy. Afterwards it was determined to be a civil corporation.

Senator KITTREDGE. And that was determined by a decree of court, as I understand the situation.

Mr. PASCO. Yes; but I want to say, with reference to this company—and perhaps it is well to put it in right here—something connected with the question asked of me the other day with reference to a declaration of the French Government at the time when these concessions were granted. It will make it clear that it was a private company. I could not then put my finger on the place, but I have just come from the Senate library, where I found this declaration.

Senator KITTREDGE. You refer now to the declaration of France regarding her intentions made about the time the work was begun on the Panama route.

Mr. PASCO. Yes. There are two communications in H. Ex. Doc. 1, Forty-sixth Congress, third session, volume 1, part 1, pp. 385, 386, relating to this declaration. I will read them, the first of which is from the French minister, M. Max Outrey, to Secretary Evarts:

LEGATION OF FRANCE,
Washington, March 22, 1880. (Received March 23.)

Mr. SECRETARY OF STATE: Since the time when it was proposed to form a company for the construction of a canal through the Isthmus of Panama, I have several times had occasion in our interviews to communicate to you the views of my government with regard to this project. I have informed you that the French cabinet had from the outset expressed its firm purpose to allow the character of the enterprise inaugurated by Mr. De Lesseps to remain an essentially private one and that it did not propose to deviate from that course. Although we have for the conceptions of our eminent compatriots the sympathy which it is impossible not to feel for projects whose accomplishment would be an honor to civilization and to the age in which we live, the French Government, as I have had the honor to assure you, is in no way concerned in that enterprise and in no way proposed to interfere therein or to give it any support, either direct or indirect.

"I am happy to be authorized to comply with the desire which you have expressed to me by now renewing in writing assurances which I have no doubt will put an end to all uncertainty as to the nature of the purposes entertained by my Government.

"Be pleased to accept, etc.,

"MAX OUTREY."

Now I will read the answer to that communication from the Secretary of State, which follows:

"DEPARTMENT OF STATE,
" *Washington, March 25, 1880.*

"SIR: I have the honor to acknowledge the receipt of your note of the 22d instant, wherein you refer to the statements you had previously made to me, now repeated, that the French Government had from the outset expressed the firm purpose to leave to the enterprise inaugurated by Mr. De Lesseps for the construction of a canal through the Isthmus of Panama its entirely private character.

"I notice also that you observe that even if you have sympathies with the conceptions of your distinguished fellow-citizens, the French Government, as you have heretofore said to me, is absolutely a stranger to the enterprise and does not intend to participate therein in any manner, nor to give it any support, direct or indirect.

"In reply I have the honor to assure you that I have at all times received the statements with an entire confidence in the open sincerity and good faith of the Government of France in making them, and am happy to find in this renewed and more formal representation now made a complete conformity with the repeated assurances heretofore given me in the name and by the authority of your Government.

"Accept, etc.

"WM. M. EVARTS."

Senator KITTREDGE. That answers the inquiry made by me the other day on that subject.

Mr. PASCO. Yes; I was not able to produce it the other day, but I thought I could find it.

Senator KITTREDGE. Now, the old Panama company continued in existence until what time?

Mr. PASCO. The old Panama company continued in existence until about 1889, my recollection is.

Senator KITTREDGE. And then what happened?

Mr. PASCO. It was unable to carry on its enterprise, and on the 4th day of February its dissolution was pronounced by the French court, and a receiver was appointed to take charge of its affairs.

Senator KITTREDGE. Have you a copy of the decree of the court to which you have just referred?

Mr. PASCO. Yes; there is a copy of it in the appendix which I have already mentioned.

Senator KITTREDGE. This paper which you have here is what?

Mr. PASCO. That is a translation of the decree.

Senator KITTREDGE. The one you refer to?

Mr. PASCO. Yes.

Senator FOSTER, of Louisiana. What decree is that?

Mr. PASCO. The decree declaring the dissolution of the old company and the appointment of a receiver or liquidator, as he is termed, to take charge of its affairs.

Senator HAWLEY. This is in one of your appendixes?

Mr. PASCO. Yes; you will notice there is a list of the appendixes given in the early part of our report.

Senator MORGAN. Have you any copy of that paper here?

Mr. PASCO. I have; but I do not like to break the files of the office. I can leave it to be copied if it is desired. Do you wish to have me read it?

Senator MORGAN. Yes.

Mr. PASCO. Very well [reading]:

“Extract from the judgment of the civil tribunal of the Seine, rendered February 4, 1889, pronouncing the dissolution of the Compagnie Universelle du Canal Interoceanique de Panama and appointing a receiver.

“The court, in consideration that the civil or commercial character of a company is recognized, not by the particular form which it takes, but by the nature of the enterprise which constitutes its principal object, that it therefore matters little that the Compagnie du Canal Interoceanique de Panama is a socitie anonyme, this circumstance not being enough to impress upon it a commercial character;

“In consideration that as to its object according to article 2 of its articles it comprises the construction of a maritime canal for deep-water navigation between the Atlantic Ocean and the Pacific Ocean, across the part of the American Isthmus which belongs to the United States of Colombia, as well as the operation of said canal and of the various enterprises which are connected therewith; that in reality the company is formed for the operation of the canal and in view of the profits which it may obtain and that the construction itself is not the principal aim of the enterprise, but only a necessary means for carrying it out;

“That the operation can not be assimilated to a transportation business, the company limiting itself to the opening of a new way for navigation upon payment of fixed tolls;

“In consideration that therefore the company has for its principal object the development of real estate under conditions under which the State of Colombia might have developed it itself if it had not granted the concession to third parties; that it is therefore purely civil, and that on this account, its duration being moreover limited, any one of the associates may apply for its dissolution in conformity with article 1871 of the civil code;

“In consideration that the objection would be unavailing, that the present application has been made in violation of article 74 of the articles of incorporation, according to which no proceeding at law can be taken by one or more shareholders against the company, its board of directors, or one of the members of the board, until it has been submitted to the examination of the shareholders' meeting, whose opinion is to be submitted to the court at the same time with the action; that on the one hand this provision, which implies a simple opinion to be stated by the shareholders' meeting and not at all a preliminary consent to be given by it, is not of such a character as to be binding upon the court when it is not set up by the defendant; that it could not moreover prevail against the right which every member acquires by article 1871 of the civil code, the protection of which concerns considerations of public policy; that on the other hand it appears from the papers in the case that if the special shareholders' meeting of January 26 last could not be legally organized, in spite of the reiterated notices sent to the shareholders, there is no reason to hope that a new call would have a more efficacious result; that thus the plaintiffs would be deprived by the mere force of circumstances and without possible recourse of a right which article 1871 of the civil code intended to assure them; that finally the calling of a new meeting would involve, according to the articles, such delays that the corporate interests which are now at stake might suffer irreparable injury;

“In consideration that the further objection can not prevail, that in accordance with article 68 of the articles of incorporation the dissolution of the company before its expiration must be voted by a meeting of shareholders, held under special conditions fixed in article 69; that none of the terms of these articles implies the idea that the right in question belongs exclusively to the shareholders' meeting, and that the courts are deprived of it; that such a provision would be in contradiction with the principle laid down in article 1871 of the civil code, and would obviously nullify its objects;

“That furthermore what was said above relative to the shareholders' meeting of January 26 last and the impossibility of calling to any useful purpose a new meeting within the period fixed by the articles is pertinent here again, and that from every point of view the application should be received;

“In consideration that on the merits article 1871 of the civil code confers upon the court the power of deciding finally whether the company under the circumstances contemplated can still continue its normal course or whether its dissolution is rendered necessary by the very situation in which it is placed; that it is now established that the Compagnie du Canal de Panama has ceased to act in a regular way; that it has suspended payment upon its securities, and that the continuation of work on the canal is insured only for a very limited time; that since December 14 last it has been necessary to confide its man-

agement provisionally to appointees of the court, who have taken the necessary measures to protect temporarily the important interests connected with its existence; that these wholly provisional measures are now insufficient or will shortly become so, and that it is important to take action to ward off dangers, the consequences of which would be irreparable;

"In consideration, therefore, that there is occasion for pronouncing the dissolution of the company and providing for its winding up; that there is occasion, also, for ordering a provisional execution of the present judgment notwithstanding appeal, and without security, applying article 135 of the code of civil procedure;

"For these reasons pronounces the dissolution of the *Compagnie Universelle du Canal Interoceanique de Panama*, and orders that it be wound up;

"Appoints Mr. Joseph Brunet receiver of said company with the broadest powers, especially to grant or contribute to any new company all or a part of the corporate assets, to enter into or ratify with the contractors for the Panama Canal all agreements having for their purpose the insurance of the continuance of the works, and to this end to contract all loans and form all sinking funds;

"Declares that in case the receiver appointed can not act provision will be made for replacing him in the ordinary way;

"Authorizes him henceforth to apply in the same way for all special powers which may be necessary for the performance of his duties, and, if he thinks fit, for the addition of one or more receivers;

"Orders provisional execution of the present judgment, notwithstanding appeal and without security;

"Condemns the defendant company to the expenses."

Senator KITTREDGE. Have you examined into the French law on the question of the jurisdiction that court might exercise?

Mr. PASCO. Well, I have not looked up especially the question of jurisdiction, but the jurisdiction of the court is probably stated in the general incorporation act. If not, it is in this special act.

Senator KITTREDGE. The special law you now speak of was not passed until 1893.

Mr. PASCO. The special act was passed on the 1st of July, 1893.

Senator KITTREDGE. So that the question of the jurisdiction of the court to enter the decree which you have just read depends upon the law existing at that time?

Mr. PASCO. Yes.

Senator MORGAN. What is the date of that decree you have just read?

Mr. PASCO. February 4, 1889. I can not put my finger on the place where the jurisdiction of the court is stated.

Senator HAWLEY. Has not France gone too far to raise any question about that? They have written and printed and published these things, and acted in accordance with them. How are they going to get out of it now?

Mr. PASCO. I think the fact that the court has been exercising unquestioned jurisdiction ever since that date would be a sufficient answer to that. It is for that reason that I have not looked up all these preliminary matters with the care that perhaps I should.

The act of July 1, 1893, was passed because it was found necessary to make some additional provisions of law in order to act upon this particular case.

Senator KITTREDGE. In explanation of these questions I will say that I simply desire to know where we can put our hands on the books if it becomes necessary.

Mr. PASCO. In this special act it was deemed desirable to bring all these parties into one court, and article 3 of this act of July 1, 1893, provides:

“ART. 3. All actions emanating from the receiver or from the attorneys or from interested parties individually shall be brought before the civil tribunal of the Seine. Such proceedings as may arise from the distribution of the credits or balance remaining in favor of the company shall be brought likewise before this tribunal. Suits instituted by parties intervening in damages shall remain in the jurisdiction where already the prosecution has been inaugurated.”

So that if there is any question about jurisdiction it was the purpose of this statute to bring them all into the same court, where all the questions that might arise could be passed upon.

Senator KITTREDGE. That would of course only give this court that entered the decree you have mentioned jurisdiction of matters relating to the old Panama company which occurred after the passage of that act.

Mr. PASCO. Yes.

Senator KITTREDGE. And the question I asked was whether you had in your possession the status of the laws of France which confer jurisdiction upon the court that entered the decree.

Mr. PASCO. I have not, but I think I can find the law relating to the jurisdiction.

Senator KITTREDGE. And if you haven't it, if you could cite us to the book where we could find it.

Senator MORGAN. There is a book here which will contain it.

Mr. PASCO. It may take some time to look it up. Perhaps I had better look it up and insert it in my testimony. I have not had access to the volume containing these French laws for some time. The only copy I have had was in the library of the State Department, and I thought I would look over some matters there again to-day, but instead of doing that I went to the Supreme Court library and failed to get the volume. I think I can find it, and refer the committee to the law or insert it in my testimony.

Senator KITTREDGE. I do not know that it will ever become important, but I would like to know where it is, if it does become important.

Mr. PASCO. I have never considered it important to investigate the matter of jurisdiction, because the investigations of the Commission have covered all the proceedings, and the jurisdiction of the court has never been questioned. This large proceeding has been going on now for a good many years, and nobody has raised that question.

Senator KITTREDGE. After the company went into the hands of the receiver, as evidenced by this decree, nothing of importance occurred, as I understood your testimony the other day, affecting the legal status of the question until the act of July 1, 1893. Is that right?

Mr. PASCO. That is right.

Senator KITTREDGE. And then the special act was passed?

Mr. PASCO. Yes.

Senator KITTREDGE. Relating to the Panama difficulties?

Mr. PASCO. Relating to the Panama difficulties.

Senator KITTREDGE. And I understand that has already been printed in the testimony.

Senator MORGAN. In Mr. Lampre's testimony.

Senator KITTREDGE. The general incorporation law was amended in the act of August 1, 1893?

Mr. PASCO. Yes.'

Senator KITTREDGE. Have you a copy of that amendment?

Mr. PASCO. I have a copy which we had made for the use of the Commission of the original act with the amendments written in.

Senator KITTREDGE. That is the act of 1867?

Mr. PASCO. The act of July 24, 1867, with the amendments added by the law of August 1, 1893.

Senator MORGAN. You have a copy of that there?

Mr. PASCO. Yes. The amendments are indicated in this copy by a line drawn under the new matter.

The act referred to, with the amendments, is as follows:

[Translation.]

A law on companies, enacted on the 24th day of July, 1867, together with the amendments attached to this law by the act of August 1, 1893.

The additions and amendments effected by the act of August 1, 1893, are indicated by italics (are underlined).

I. MIXED JOINT-STOCK COMPANIES.

ART. 1. Mixed joint-stock companies (i. e. companies wherein certain associates are jointly and severally responsible for the entire amount of the capital stock, while others are only responsible to the amount of their shares in, or contributions to, the said capital of said concern) shall not divide their capital stock into shares, or fractions of shares, amounting to less than *twenty-five francs*, where the said capital stock does not exceed two hundred thousand francs, nor into shares or fractions of shares amounting to less than *one hundred francs*, when the capital does exceed the above-stipulated sum.

Such companies shall not be deemed formally constituted according to law until after the entire capital stock shall have been subscribed for and after every shareholder shall have made *specie* payment of the shares or fractions of shares subscribed for by him when the same do not exceed *twenty-five francs*, and of *one-fourth* at least of the amount of the said shares when the latter reach the sum of *one hundred francs* or more.

This subscription and these payments must be evidenced by a declaration or statement made in writing by the manager and bearing a notarial seal.

This declaration or statement must be accompanied with a list of the subscribers, with a statement of the payments received, with a duplicate of the articles of agreement forming the basis of the concern, if the said articles are merely under private signature and unsealed, and with a certified copy of the same in cases where they bear a notarial seal and have been acknowledged before a different notary from the one who took the declaration aforesaid.

The unsealed articles shall be made in duplicate, whatever may be the number of parties associated; one of the said duplicates shall be appended, as stated in the preceding paragraph, to the declaration showing the subscription of the capital and the payment of at least

one-fourth as above provided for, and the other shall be deposited and shall remain at the headquarters or main office of the organization.

ART. 2. Shares or fractions of shares shall be negotiable after the payment of one-fourth herein above stipulated.

ART. 3. *Until they are fully paid for shares shall be registered in the owner's name on the books of the company. Those shares which represent contributions must always be fully settled and paid for at the time when the association is effectively constituted.*

The certificates representing these shares of stock shall not be detachable from the book nor negotiable until two years after the final constitution and organization of the concern.

During this time they shall be marked, by care of the directors, with a stamp indicating their character and giving the date of the constitution and organization aforesaid.

Parties appearing on the books as owners of a share of stock, intermediary transferees of the same, and the subscriber or subscribers, are all jointly and severally responsible for the amount of the share.

A subscriber or holder of stock who has transferred his title ceases to be responsible two years after the date of said transfer for such payments or assessments as have not yet been called for.

ART. 4. When one of the parties makes a contribution otherwise than in species, or stipulates special benefits in his own behalf, the value of his contribution must be estimated or the reason of the stipulated benefits must be appraised by the first general meeting.

The association is finally organized and constituted only after another general meeting has been called and has approved the contribution or benefits aforesaid.

The second general meeting shall only pass upon the said contribution or benefits for approval, provided a report or statement of the same shall have been printed and held at the disposal of the shareholders for at least five days previous to the said meeting.

A majority of shareholders present will carry. This majority must comprise at least one-fourth of the shareholders and must represent, in species, at least one-fourth of the capital of the organization.

Such parties as have made the contribution in question, or have stipulated the benefits aforesaid, are excluded from the vote hereinbefore provided for.

In default of approval as aforesaid, the association has no binding force on any of the parties whomsoever.

The approval aforesaid does not bar subsequent action for fraud.

Where the association receiving the contribution aforesaid of a non-specie character is formed between parties who are all joint owners of the undivided object representing the said contribution, there shall be no application of those provisions of the present article which look to the verifying of nonspecie contributions.

ART. 5. A supervising board, or board of directors, composed of at least three shareholders, shall be established in all mixed joint stock companies.

This board is to be named by a general meeting of the shareholders immediately after the final constituting of the organization, and before the latter shall have engaged in any official operation.

It is to be presented for reelection at the times and under the circumstances and conditions prescribed by the charter and by-laws of the association.

However, the first board is to be nominated only for one year.

ART. 6. The first duty of this board, after its appointment, is to ascertain whether all regulations contained in the preceding articles have been observed.

ART. 7. Any limited partnership formed in disregard of the requirements set forth in articles 1, 2, 3, 4, and 5 of the present act shall be void and of no effect as to all parties interested.

This nullity can not be pleaded by the associates themselves against third parties.

ART. 8. When the association is annulled in accordance with the terms of the preceding article, the members of the first board of directors may be declared responsible, together with the manager, for the damage resulting, either to the association itself or to third parties, from the annulment of the association.

This same responsibility may be decreed against such of the associates whose contributions or benefits shall not have been verified and approved in accordance with article 4 above set forth.

No action shall be brought to annul the association or to annul acts and decisions subsequent to the final constitution of the said organization when the ground of nullification shall have ceased to exist before the action be brought. Nor shall an action be brought for the enforcement of a responsibility incurred by reason of the facts which constituted a cause of nullity where said cause of nullity shall have ceased to exist, and where, moreover, three years shall have elapsed since the day when liability to annulment was incurred, previous to the bringing of said action.

If a general meeting must be called in order to remedy the causes of nullity, an action to enforce said nullity shall not be brought from or after the date of the due calling of the said meeting.

The limitation of time within which an action may be brought to nullify acts connected with the constituting and organizing of these associations is of ten years.

However, this limitation shall not be pleaded in bar before the lapse of ten years next after the promulgation of the present act.

ART. 9. Members of the board of directors incur no responsibility by reason of the acts or doings of the management or of the consequences of these acts.

Each member of the board of directors is answerable for his individual faults in the performance of his duties, according to the law.

ART. 10. The members of the board of directors must verify the books, the cash, the papers, and the stocks, bonds, etc., of the association.

Each year at the general meeting they shall make a report, in which it will be their duty to call attention to such irregularities and mistakes as they may have discovered in the inventories, and to bring out, if circumstances require it, such conditions as may militate against dividends proposed by the manager.

A declaration of dividends once made shall not be rescinded, and no reimbursement shall be sought from the shareholders, save in cases where the distribution of them shall have been made apart from all inventory or apart from conditions and results set forth in said inventory.

An action, when accrued, to recall and rescind a declaration of dividends is barred after five years from the date fixed for the distribution of said dividends.

Limitations in bar of action which have commenced to run at the time of the promulgation of this act, and which, according to former laws, require more than five years further to run from the same date, shall expire within the same lapse of time (five years from the promulgation of this act).

ART. 11. The board of directors may call a general meeting, and, provided the latter concur, may effectuate the dissolution of the concern.

ART. 12. Fifteen days at least before the general meeting is held, every shareholder may, either in person or by attorney, present himself at the main office and view the balance sheet of the concern, its inventories, and the report of the board of directors.

ART. 13. The emission of shares or of fractions of shares of an association constituted in breach of regulations set forth in articles 1, 2, and 3 of the present act shall be punished with a fine of not less than five hundred nor more than ten thousand francs.

The same penalty shall be imposed:

On the manager who shall commence official operations of the company before the board of directors have entered on the discharge of their duties.

On those who, by representing themselves as owning shares or fractions of shares to which they had no title, have fraudulently created a false majority at a general meeting; and this shall in no wise interfere with such actions for damages as the association or third parties may desire to institute.

On those who handed over shares in order that fraudulent use might be made of them.

Moreover, in the cases enumerated in the two preceding paragraphs, a further sentence of from fifteen days to six months' imprisonment may be imposed:

ART. 14. A fine of from five hundred to ten thousand francs is to be imposed for the negotiating of shares or fractions of shares, the value or form of which shall be opposed to the requirements set forth in articles 1, 2, and 3 of the present act, or for which a payment of one-fourth shall not have been made as prescribed by article 2 above.

The same penalty shall be imposed on all acts of participation in these negotiations or transfers, and on all acts of publication of the value of such shares.

ART. 15. The penalties provided for by article 405 of the penal code shall be imposed on the following persons, without, however, preventing the application of this article to all acts which go to constitute a fraud or swindle:

First. Those who by false announcements of subscriptions or of payments, or by publication, in bad faith, of subscriptions or of payments which in fact do not exist, or by any other false pretenses, have obtained or have sought to obtain subscriptions or payments;

Second. Those who in order to win subscriptions or payments have published, in bad faith, the names of persons falsely represented, in one way or another, as connected or as about to become connected with the association;

Third. Managers who, in default or absence of an inventory, or by means of fraudulent inventories, have distributed among the shareholders fictitious dividends.

The members of the board of directors are not responsible in damages for breaches of law committed by the manager.

ART. 16. Article 463 of the penal code is applicable to the facts set forth in the three preceding articles.

ART. 17. Shareholders who represent between themselves one-twentieth, at least, of the capital of the company may, in a matter of common interest, intrust one or more representatives or attorneys with the bringing or defending, at their expense, of an action against the managers or the board of directors, and with representing them in court in such cases without barring any one of them from instituting such action as may be brought by every shareholder individually and in his own name.

ART. 18. Such companies as have been formed previously to the law of July 17, 1856, and which have not complied with article 15 of the said law, must, within six months, name a board of directors in accordance with the preceding regulations.

In default of the naming or appointing of said board of directors within the time hereinabove stipulated any shareholder shall have the right to have the company dissolved.

ART. 19. Mixed joint stock companies whose formation was previous to the present law, and whose by-laws permit them to transform themselves into anonymous companies, authorized by the Government, may convert themselves into such anonymous companies in accordance with the provisions of Heading II of the present law by complying with the requirements stipulated by said by-laws for such transformation.

ART. 20. The law of July 17, 1856, is hereby repealed.

II. ANONYMOUS COMPANIES.

ART. 21. In future, anonymous companies (i. e. associations formed of shareholders whose liability does not exceed the amount of their contribution to the capital stock, managed by directors who are liable and responsible for all and any faults made in the discharge of their official duties, and carried on under a name which does not enumerate any of the stockholders or members of the company) may be formed without authorization from the Government.

Whatever be the number of associates or members, such companies henceforth may be formed by agreement in writing, duly signed, though unsealed, and made in duplicate.

They will be governed by the regulations of articles 29, 30, 32, 33, 34, and 36 of the Code of Commerce, and by those set forth in the present heading.

ART. 22. Anonymous companies are directed or managed by one or more attorneys or representatives delegated for the purpose for a specified period of time, and whose powers are revocable; they may or may not receive a salary, but are chosen from among the associates of the company.

These attorneys or representatives may, in turn, select a manager from their own number, or, if the constitution and by-laws permit, they may delegate their own powers to an attorney unconnected with the company, but for whose acts they remain responsible to the said company.

ART. 23. The company can not be formed if the number of members or associates is below seven.

ART. 24. The provisions of articles 1, 2, 3, and 4 of the present act are applicable to anonymous companies.

In the case of anonymous companies, the declaration or statement required of the manager by article 1 must be made by the promoters of the concern. This declaration or statement is submitted, together with the other documents in support, to the first general meeting, which ascertains its genuineness.

ART. 25. In any case, a general meeting is to be called, by care of the promoters of the company, subsequently to the written announcement of the subscription of the capital stock and of the payment of one-fourth of this capital in species. This meeting appoints the first directors; it appoints likewise, for the first year, the commissioners or supervisors provided for by article 32 herein below set forth.

These directors can not be appointed for more than six years; they may be reelected, save where the by-laws stipulate to the contrary.

However, they may be named or designated by the constitution and by-laws, with an express provision that their appointment shall not be submitted to the general meeting for approval. In this case they can not be named for more than three years.

The minutes of the meeting note the acceptance of the directors and commissioners or supervisors present at the meeting.

The due formation and establishment of the company dates from this acceptance aforesaid.

ART. 26. The directors must own a certain number of shares, to be determined by the charter and by-laws of the company.

These shares are totally answerable as a part of the guarantee for all the acts of the management, even for the exclusively personal acts of one of the directors.

They are registered by name, untransferable; they bear a stamped indication of their nontransferability, and are deposited in the company treasury.

ART. 27. A general meeting is held, at least once a year, at the time appointed by the by-laws. The by-laws determine the number of shares which one must hold, either as owner or as attorney, in order to obtain admission to the meeting; also the number of votes falling to each shareholder in consideration of the number of shares held by him.

All holders of a number of shares insufficient to admit them into the meeting according to the requirements may band together so as to unite a sufficient number of shares and to have themselves represented by one of their number.

However, in those general meetings, which are called for the purpose of verifying contributions, of naming the first directors, and of ascertaining the genuineness of the declaration or statement made by the promoters of the company in accordance with the second paragraph of article 24 hereof, every shareholder may, regardless of the number of shares held by him, take part in the deliberations and cast the number of votes determined by the by-laws; provided, however, the said number of votes do not exceed ten.

ART. 28. In all general meetings a majority of votes shall carry. A roll-call sheet is kept, to be signed by all members present. It bears

the names and residences of the shareholders, as well as the number of shares held by each one of them.

This list is certified to by the presiding board of the meeting (consisting of the presiding officer and the secretary, together with two prominent associates selected for the purpose), and is deposited at the main office of the company. It must be shown to anyone applying for the same.

ART. 29. General meetings called for other purposes than those set forth in the two articles following must be attended by a number of shareholders representing at least one-fourth of the capital stock.

Should the general meeting not receive this attendance, a new meeting is called according to the forms and within the space of time prescribed by the constitution and by-laws. The deliberations and acts of this new meeting will be valid, whatever may have been the proportion of capital stock therein represented by the shareholders present.

ART. 30. Meetings called to deliberate on the verifying of contributions, on the appointment of the first directors, on the genuineness of the declaration or statement made by the promoters, as required by paragraph 2 of article 24 hereof, must be attended by a number of shareholders representing at least one-half of the capital stock.

In computing the capital stock, one-half of which must be represented at a meeting for verifying a contribution, contributions which are free from this verifying requirement are alone to be taken into account.

Should the general meeting represent less in its attendance than one-half of the capital stock, it can take only a temporary decision. In this case, a new general meeting is called.

The temporary decisions taken by the first meeting are made known to the shareholders by publication at two distinct times, at an interval of eight days from each other, one month at least in advance of the new meeting, said publication to be made in some newspaper designated to receive legal notices. The decisions in question become final once they are confirmed by the new meeting, provided the attendance at said meeting represent one-fifth at least of the capital stock.

ART. 31. Meetings having to deliberate on amendments to the constitution and by-laws, or on motion to prolong the existence of the company beyond the time agreed on, or to dissolve said company before the date appointed for such dissolution, are deemed to be regularly and duly held, and their decisions are considered valid only when the attendance at such meetings represents at least one-half of the capital stock.

ART. 32. The annual general meeting appoints one or more commissioners, whether members or not of the company, whose duty it will be to present to the general meeting of the following year a report on the situation and condition of the society or company, on the balance sheet, and on the accounts presented by the directors.

The approval of the balance sheet and of the accounts aforesaid is null and void if it has not been preceded by this report of the said commissioners or supervisors.

In case the general meeting has failed to name the commissioners or supervisors aforesaid, or in case one or more of the said officials be prevented or refuse to serve, their nomination or substitution is effected by an order of the president of the tribunal of commerce.

sitting at the legal residence of the company, on the request of any party interested, and after due summoning of the directors.

ART. 33. During the three months next preceding the date set by the constitution and by-laws for the holding of the general meeting the commissioners or supervisors have the power and authority to look over the books and to examine into the operations and workings of the company as often as they may deem it expedient for the interests and for the good of the concern.

They may at any time in urgent cases summon a general meeting.

ART. 34. Every anonymous company must draw up, once in six months, a summary of its debit and credit accounts.

This summary is kept at the disposal of the commissioners or supervisors.

Moreover, an inventory is drawn up every year, as required by article 9 of the code of commerce, giving a statement of the personal and real property of the company, besides a report of all debts due to and by the company.

The inventory, the balance sheet, and the profit and loss accounts are placed at the disposal of the commissioners at least forty days before the general meeting. They are presented to this meeting.

ART. 35. At least fifteen days before the general meeting is held every shareholder may view the inventory and the list of shareholders at the main office of the company, and may require a copy of the balance sheet summing up the inventory, as well as a copy of the commissioners' report.

ART. 36. Every year an assessment of one-twentieth is made and levied on the net profits for the purpose of forming a reserve fund.

This assessment will cease to be obligatory once the reserve fund shall have reached a sum equal to one-tenth of the capital stock.

ART. 37. In case the company should have sustained the loss of three-fourths of its capital stock, the directors must call a general meeting of all the shareholders, for the purpose of considering the advisability of dissolving the company.

Whatever may be the decision taken by the company, it is announced by publication.

Should the directors fail to call the general meeting aforesaid, as in a case where the said meeting could not have been brought together in a regular manner, any party interested may petition the tribunals for a dissolution of the company.

ART. 38. Dissolution may be decreed on the request of any interested party where for more than a year the number of members has been less than seven.

ART. 39. Article 17 is applicable to anonymous companies.

ART. 40. Unless they be so authorized by the general meeting, the directors are prohibited from either taking or preserving an interest, whether direct or indirect, in an undertaking or in a contract made with the company or in its behalf.

Every year a report is presented to the general meeting, rendering special account of the manner in which enterprises or contracts authorized by it, in accordance with the terms of the preceding paragraph, have been carried out or executed.

ART. 41. Any anonymous company, in the formation of which due observance has not been had of the requirements set forth by articles

22, 23, 24, and 25 herein above, is null and void as against interested parties.

ART. 42. When, in accordance with the terms of the preceding article, the company or its acts and deliberations have been annulled, the promoters who were the cause of the nullity and the directors who were in office when the nullity was incurred are jointly responsible to third parties *and to the shareholders for the injury resulting from the said annulment.*

The same joint responsibility may be decreed against those members whose contributions or benefits have not been verified and approved, as prescribed by article 24, and in compliance therewith.

The action for annulment and that to enforce the responsibility resulting therefrom are both governed by the provisions of article 8 hereinabove set forth.

ART. 43. The extent and effects of the commissioners' responsibility to the company depend on the general regulation of their powers as set forth in the instrument creating and appointing them.

ART. 44. The directors are responsible in accordance with law, individually or jointly, as the case may be, to the company or to third parties, for breach of the provisions of the present act, and for faults committed by them in their management, such, for instance, as the distributing or allowing the distribution of fictitious dividends, without opposing the same.

ART. 45. So far as they concern anonymous companies, the provisions of articles 13, 14, 15, and 16 of the present act apply without distinction to those companies which are actually in existence and to such as will be formed under the said present act. Such directors as will have brought about fictitious dividends in the absence of an inventory, or by means of false inventories, will suffer the penalty provided for such cases by No. 3 of article 15 against the managers of mixed joint stock companies.

The provisions of the three last paragraphs of article 10 are likewise applicable in so far as they concern anonymous companies.

ART. 46. Anonymous companies actually existing shall continue, so long as they endure, to be governed by the regulations to which they are submitted.

By obtaining the authorization of the Government, and by observing the forms prescribed for the modification of their by-laws, they may transform themselves into anonymous companies within the terms of the present act.

ART. 47. Companies having a limited responsibility may transform themselves into anonymous companies within the terms of the present act by observing the conditions stipulated for the modification of their by laws.

Articles 31, 37, and 40 of the code of commerce, and the law of May 23, 1863, on companies with limited responsibility, are hereby repealed.

III. SPECIAL REGULATIONS FOR COMPANIES WITH VARIABLE CAPITAL.

ART. 48. The by-laws of any company may provide for an increase of the capital stock, either by successive payments made by the members or by the admission of new members, and for a decrease of the capital stock by a withdrawal, either total or partial, of contributions already made.

Companies whose by-laws shall contain the said provisions shall be governed independently of the general regulations governing them, according to their own special form, by the provisions of the following articles:

ART. 49. The constitution and by-laws governing the company shall not provide for a capital stock in excess of the sum of two hundred thousand francs.

This may be increased from year to year by the general meeting, though no one increase thus decided upon shall exceed the sum of two hundred thousand francs.

ART. 50. The shares or fractions of shares shall be registered by name, even after they have been fully paid.

They shall be negotiable only after the final formation of the company.

Such transfer can only be effected by a corresponding transfer on the books of the company, and the constitution and by-laws may vest either in the board of directors or in the general meeting the power of opposing such transfer aforesaid.

ART. 51. The constitution and by-laws shall fix a sum or amount below which it shall be unlawful to reduce the capital stock by withdrawal of contributions as provided by article 48.

This sum or amount shall not be less than equal to one-tenth of the capital stock.

The company shall be deemed finally formed and constituted only after the payment of one-tenth at least of the capital stock.

ART. 52. Any associate may withdraw from the company when he sees fit, save where there is an agreement to the contrary and save where this would entail a breach of paragraph first of the preceding article.

It may be stipulated that the general meeting shall have power to decide, by the majority required for a modification of the constitution and by-laws, on the striking off from the list of members or associates one or more of the names therein.

An associate who ceases to belong to the company, whether of his own accord or as the result of the decision of the general meeting, shall remain responsible to the associates and to third parties for the obligations of the company at the time of his withdrawal during a period of five years occurring next after said withdrawal.

ART. 53. Whatever be the form of the company, its directors shall be the proper parties to represent it before the courts.

ART. 54. The company shall suffer no dissolution on account of the death, retirement, interdiction, failure, or insolvency of one of the associates; it will continue in full force between, and as to, the other associates.

IV. RULES TOUCHING THE PUBLICATION OF ARTICLES OF AGREEMENT.

ART. 55. Within the space of one month from the formation of any commercial company or association there shall be deposited in the records of the peace justice court and in those of the tribunal of commerce within whose jurisdiction the company is formed a duplicate of the articles of agreement constituting the basis of the company, if these articles are unsealed, or a certified copy of the same if they have been acknowledged before a notary.

In the case of mixed joint-stock companies and of anonymous companies, there shall be appended to the said articles of agreement (1) a certified copy of the sealed and duly acknowledged notarial statement, in writing, of the subscription of the capital stock and of the one-fourth payment prescribed by the present act; (2) a certified copy of the decisions adopted by the general meeting in the cases provided for by articles 4 and 24.

Moreover, there must be joined to the articles of agreement, when the company is an anonymous one, a duly certified and authenticated list, by name, of the subscribers, giving the names, surnames, occupation, residence of each one, as well as the number of shares held by each associate.

ART. 56. A summary of the articles of agreement and of the appended documents is published, within the space of one month afore said, in one of the newspapers designated for legal notices.

This publication in said newspaper shall be proved by a copy of the paper in question, duly certified to by the printer, authenticated by the mayor, and recorded within three months from the date thereof.

A failure to observe the prescriptions of the preceding and present articles will nullify the entire proceedings as to the associates of the company; but no breach of any of said prescriptions may be pleaded by the members as against third parties.

ART. 57. The summary above mentioned must contain also the names of associates other than shareholders; the official name adopted by the company and the locality of its legal residence; the names of such associates as are authorized to manage, direct, and sign for the company; the amount of the capital stock and the sum of valuable contributions furnished or to be furnished by the shareholders; the date of the launching of the company and that of its intended dissolution, as well as the time at which the deposits aforesaid were made in the records of the peace justice court and of the tribunal of commerce.

ART. 58. The summary must state whether the company is a general partnership, or is a limited partnership simply, or a mixed joint-stock company, or anonymous, or with variable capital.

If the company is anonymous, the summary must state the sum of capital stock paid in species and the sum paid otherwise than in species, together with the amount of pro rata assessment which must be levied on the profits in order to constitute the reserve fund of the company.

Finally, if the company is one with variable capital stock, the summary must indicate the sum or amount below which the said capital stock can not be lawfully reduced.

ART. 59. In case the company have several establishments doing business in various districts, the deposit prescribed by article 55 and the publication required by article 56 must be made in each district where such establishments exist.

In such cities as are divided into several districts it will be sufficient to make said deposit in the records of the peace justice court within whose jurisdiction or district lies the chief of these establishments.

ART. 60. The summary of the acts and documents deposited is to be signed, in the case of public official documents, by the notary; in the case of documents under private signature merely and unsealed, by the members in the firm name, by the managers of limited partnerships or of mixed joint stock companies, and by the directors in the case of anonymous companies.

ART. 61. The formalities prescribed and penalties imposed by articles 55 and 56 apply to:

All acts and resolutions looking to the amendment of the constitution and by-laws, to the prolongation of the company's existence beyond the period of time originally agreed upon and fixed, to dissolution before the expiration of the said period of time, and to the manner of winding up the affairs of the concern, to any change in the official name of the company or to any change among, or withdrawal of, members.

Such decisions as are arrived at in the cases provided for by articles 19, 37, 46, 47, and 49, herein above set forth, are also governed by the requirements of articles 55 and 56.

ART. 62. The following documents are not subject to the deposit and publication requirements aforesaid: Documents setting forth an increase or decrease of the capital stock, done in accordance with the terms of article 48 herein above, or the withdrawal of members other than managers or directors, such withdrawal taking place within the terms of article 52 hereof.

ART. 63. In the case of mixed joint-stock companies or of anonymous companies, any person may demand a view of the documents deposited among the records of the peace justice court and of the tribunal of commerce, and may even demand, at his own cost, a certified copy or summary of the said documents, from the clerk or from the notary in charge of the same.

Likewise any person may, for a sum not exceeding one franc, demand at the legal residence of the company a certified copy of its constitution and by-laws.

Finally, a copy of the deposited documents must be publicly exposed in the offices of the company.

ART. 64. In all acts or documents, invoices, notices, publications, etc., whether *printed or holographic*, emanating from anonymous companies or from mixed joint-stock companies, the official name of the concern must always be followed by these words, written out in full and legibly: "*Anonymous company*," or "*Mixed joint-stock company*," together with the amount of the capital stock.

In case the company has availed itself of the right granted it by article 48 hereof, this must be shown by the addition of the following words, "*with variable capital stock*."

Any breach of the preceding requirements is punished with a penalty or fine of not less than fifty nor more than one thousand francs.

ART. 65. Articles 42, 43, 44, 45 and 46 of the Code of Commerce are hereby repealed.

V. ON TONTINE AND OTHER INSURANCE COMPANIES.

ART. 66. Associations in the nature of tontine and life insurance companies, whether they be mutual or do business on a premium basis, remain subject to the authorization and supervision of the Government.

Other insurance companies may form and organize without authorization specially granted. The conditions under which they may organize shall be determined by a public administration ordinance.

ART. 67. Insurance companies coming under the second paragraph of the preceding article, and actually in existence, may, without spe-

cial authorization from the Government, set themselves within the pale of the said administration ordinance by observing the formalities required and the conditions prescribed for the amendment of their constitution and by-laws.

MISCELLANEOUS PROVISIONS.

ART. 68. *Whatever be their object or purpose, all limited partnerships, mixed joint-stock companies, or anonymous companies organized and constituted in accordance with the requirements of the Code of Commerce or of the present act, shall be deemed commercial companies and shall be governed by the usages and customs of trade.*

ART. 69. *The power of mortgaging in the name of any commercial company may be granted by the articles of agreement, even unsealed, or by resolutions or authorization set forth in the manner and form stipulated by the said act. The mortgage deed shall be duly authenticated according to the terms of article 2127 of the Civil Code.*

ART. 70. *In all cases where companies have continued to pay interest or dividends on shares, obligations, or any other values which a drawing by lot has made reimbursable, said companies shall not withhold the value of such interest or dividends once paid, when the claim to reimbursement shall be made.*

TEMPORARY PROVISIONS.

Mixed joint-stock companies and anonymous companies already existing, whether anterior or subsequent to the law of July 24, 1867, preserve whatever power they may have to convert registered stock, before final payment, into coupon shares, or stock transferable by mere delivery.

As to the registered stock of the said companies, the two years of limitation in bar of actions against a subscriber or shareholder who has transferred his title to another party, for the enforcement of payments for which a call had not been issued at the time of said transfer, shall only begin to run, as to creditors previous to the present act, from the date when the said act shall go into force. This shall not prevent the application of article 2257 of the Civil Code on conditional credits and on credits given for a set period of time, as well as on actions to enforce contracts of guarantee.

Articles 8 and 42 apply to companies already constituted under the law of July 24, 1867.

In these same companies suit for annulment in accordance with articles 7 and 41 can not be brought if the grounds of such annulment have ceased to exist at the time of the present act entering into force.

In any case an action to enforce responsibility for acts which were the basis of the nullity aforesaid shall be barred only after three years from the date of the present act entering into force.

Civil, i. e., nontrading, companies or associations now organized under other forms may, if their constitution and by-laws permit, convert themselves into limited partnerships or mixed joint-stock companies, or into anonymous companies, by a vote of the general meeting specially summoned for the purpose, and by complying with the requirements of the articles of agreement as well as article 31 hereof.

Senator KITTREDGE. What was the next step taken in this matter?

Mr. PASCO. The next step was the organization of the new company and the contribution, as it is termed, to it of the canal property.

Senator KITTREDGE. Now, do you remember whether there was a petition made by the receiver to the court for permission to enter into dealings with the New Panama Company?

Mr. PASCO. I have a copy of that proceeding.

It is as follows:

[Translation.]

Extract from the minutes of the civil tribunal, lower court, for the Department of the Seine, sitting in the Palace of Justice, Paris, June 29, 1894, approving and ratifying the charter of the New Panama Canal Company.

The civil tribunal, lower court, for the Department of the Seine, sitting in the Palace of Justice, Paris, has rendered, in open and public session of its first division, the following judgment:

Done at the sitting of the twenty-ninth day of June, eighteen hundred and ninety-four.

The tribunal having examined and considered the petition presented by Gautron as receiver of the court for the Universal Company of the Panama Interoceanic Canal, which petition is signed by de Biéville, his counsellor, and the tribunal having also examined and considered the documents produced, and the petition aforesaid being conceived as follows:

To the honorable the president and justices of the first division of the civil tribunal of the Seine, the petitioner, Mr. Jean Pierre Gautron, receiver of the court, residing in Paris, number thirteen Tronchet street, represents as follows:

That he is acting in his capacity as receiver for the Universal Company of the Panama Interoceanic Canal, whose legal residence is in Paris, number sixty-three bis, rue de la Victoire; that he was named receiver as aforesaid by a decree rendered in chambers by the civil tribunal of the Seine on the twenty-first day of July, eighteen hundred and ninety-three.

That he, through his attorney and counsellor, Mr. de Biéville, respectfully states that on the fourth day of February, eighteen hundred and eighty-nine, Mr. Joseph Brunet was named, by recorded decree of the first division of this tribunal, receiver for the Universal Company of the Panama Interoceanic Canal and was given most extensive powers, notably that of granting or making a contribution of either the whole or a part of the assets of the company to a new company or association.

That by a recorded decree of this tribunal, rendered in chambers on the thirteenth day of February, eighteen hundred and ninety, Mr. Achille Monchicourt was named coreceiver for the said company, with Mr. Joseph Brunet, and was given the same powers, to use individually or in conjunction with the latter.

That owing to the resignation of Mr. Brunet, Mr. Achille Monchicourt has been confirmed by a chambers decree dated the eighth day of March, eighteen hundred and ninety, as sole receiver for the said company, with the broadest powers, notably that of giving or making a contribution to a new company or association of either the whole or a part of the assets of the company aforesaid, of entering into and rectifying with contractors all contracts and agreements aiming to the continuation or preserving of the work and of prolonging and renewing all agreements, of giving all guarantees necessary for this purpose.

Finally, that by a decree rendered in chambers on the twenty-first day of July, eighteen hundred and ninety-three, Mr. Jean Pierre Gautron was appointed coreceiver with Mr. Achille Monchicourt, with the same and equal powers, to use individually or jointly with the said Mr. Monchicourt.

That owing to the decease of Mr. Achille Monchicourt, which occurred on the fourteenth day of March, eighteen hundred and ninety-four, Mr. Gautron remains sole receiver of the Panama Inter-oceanic Canal Company.

That a new company is in process of formation at the present time for the purpose of resuming the work and completing the canal.

That the constitution and by-laws of this company, called the New Panama Canal Company, have been drawn up and deposited for record by Mr. Gustave Ramet, formerly president of the Tribunal of Commerce at Rennes, and have been filed also in the records and minutes of Mr. Lefebvre, notary, in Paris.

That your petitioner, by virtue of the powers conferred by the orders and decrees aforesaid on the receiver for the Panama Inter-oceanic Canal Company, is preparing to make contribution to the new company now being constituted: First, of all rights whatsoever accruing to the old company from the laws of the Government of the United States of Colombia, dated May eighteenth, eighteen hundred and seventy-eight, and December twenty-sixth, eighteen hundred and ninety, as well as from all decrees, acts, or facts whatever having followed upon these laws in the course of their execution, and all advantages and benefits accruing therefrom and stipulated by these laws and decrees, together with all territory and real estate having been granted and ceded to the Interoceanic Company now in process of liquidation, or acquired by the same, all this provided the new company fulfil the conditions prescribed and imposed by the laws and acts passed in granting or extending the concession, and provided it pay and discharge all sums and indebtedness remaining due to the Colombian Government by the old company.

Secondly. Of the work already done and accomplished, of the yards, workshops, buildings, hospitals, plant mounted and unmounted, and of the stores, &c., belonging to the receivership as well as of all deposits.

Thirdly. Of the plans, estimates, surveys, and specifications, and of all documents whatsoever gathered and collected by the Universal Company of the Interoceanic Canal bearing in any manner on the study, construction, or improvement and operation of the canal or of its appurtenants, as well as the privileges attached to the same, and all contracts or agreements with third parties.

Fourthly. Of all rights of any nature and description, part ownership, or any other rights whatsoever which may belong or accrue to the Interoceanic Canal Universal Company now being liquidated in the Panama Railroad at Colon, now worked and operated by an American company known as the Panama Railroad Company, whose legal residence is in New York. The said rights shall be transferred, such as they are, carrying with them all privileges entailed by them, and Mr. Gautron binds himself, in his official capacity, to invest with them the present company in the form and in compliance with all formalities required for such transfer by the laws of the United States of America.

The said rights shall be transferred, as well as the said property, in full, such as they exist and with all that they entail.

Your petitioner further respectfully shows as follows:

That the said grant and contribution are made, or are to be made, by him, with the following reservations and under the following conditions, to wit:

First. The receivership shall have and receive a part in the net profits and gains of the enterprise, amounting to sixty per cent of the said profits and gains, such as the same shall be determined and computed under articles fifty-one and fifty-two of the by-laws.

Secondly. Fifty thousand shares of entirely paid-up stock shall be given to the Government of the United States of Colombia, as prescribed by the extension act of December twenty-sixth, eighteen hundred and ninety.

Thirdly. The rights of every nature and description accruing to the receivership from the Panama Railroad and ceded by Mr. Gautron, as set forth in paragraph four above, shall become the property of the new company from the date of the meeting provided for by article seventy-five of the constitution and by-laws. No pecuniary compensation is required of the new company for the cession of said rights; but they are transferred on the condition and with the full understanding that said transfer shall be void if the canal be not completed within the time appointed by the grant. Should the work not be completed within the said period of time, the said rights shall revert to the receivership.

If, contrary to all expectations, the meeting in question should fail to take the necessary measures to complete the canal, or if the measures thus taken by said meeting should fail of execution by reason of impossibility to carry them out, the present company would still retain the said rights accruing from the railroad aforesaid; but it would have to pay to the receivership a sum of twenty million francs as an indemnity, while the receivership's share in the gains and profits of the new company would then be equal to one-half of said gains and profits without further previous deduction than such as is provided for by paragraphs two and three of article fifty-one.

Fourthly. Until the full completion of the canal, Mr. Gautron shall have power, in his capacity as receiver, to appoint a controlling or supervising committee, composed of three members, selected, as much as possible, from among civil engineers and finance inspectors, in order to inspect the progress of the work, the condition and maintenance of the plant and of the real property, as well as the accounts kept in relation to these various objects.

The compensating of this committee shall be at the expense of the new company.

Your petitioner further shows that it is proper for him to submit to the Civil Tribunal of the Seine, for ratification and approval, the conditions of the said grants and contributions, and the constitution and by-laws of the company formed for the completion of the canal.

Wherefore your said petitioner, acting in his official capacity, respectfully requests and prays the honorable president and associate justices of this court purely and simply to ratify and approve the purport and conditions of the grants or contributions intended to be made by the receiver for the Universal Company of the Panama Interoceanic

Canal to the New Panama Canal Company now in process of formation, as well as the constitution and by-laws of the last-mentioned company.

All proper reservations being made, justice will be done.

A. DE BIÉVILLE.

Having considered the order issued by the president of the court, dated the twenty-seventh day of June, eighteen hundred and ninety-four, appended to the said petition, and directing:

That this be communicated to the commonwealth attorney, and that Mr. de Boislisle, vice-president, is hereby appointed to make a report. Done at the Palace of Justice, Paris, on the twenty-seventh day of June, eighteen hundred and ninety-four, and signed Baudouin.

Having considered the written opinion of the commonwealth attorney, likewise appended to the said petition, which opinion is thus conceived: The attorney for the commonwealth refers the matter to the tribunal of justice, signed, Cabat.

Having considered articles ten and eleven of the act of July first, eighteen hundred and ninety-three, which articles are thus framed:

"ARTICLE 10. All acts tending to alienate any assets of the company, all contracts entailing a transfer or contribution of the whole or of part of the assets of the concern, emanating from the receiver of the Universal Company of the Panama Interoceanic Canal, shall be subject to the approval or ratification of the civil tribunal of the Seine, who shall, on the report of one of the justices, pass on the question in open court.

"ARTICLE 11. All decrees of approval and ratification rendered in accordance with the preceding article shall be published, within a term of ten days, in the Journal Officiel and in the Journal Officiel (commune edition)."

This decree may be attacked by a third party, by the shareholders, by the attorney of obligation holders, and by other creditors of the company, within a delay not exceeding one month from the date of the publication aforesaid. The civil tribunal shall adjudicate the question within the space of one month, as in the case of matters demanding immediate and summary adjudication. The appeal from such decision must be entered within ten days from the time of notification of said judgment to the party in person or at his domicile.

Having heard, at the sitting of the court, Mr. de Boislisle, vice-president, in his report, and Mr. Cabat, assistant attorney for the commonwealth, in his opinion, and having deliberated upon the same in accordance with law:

Whereas it appears from the terms of article five of the constitution and by-laws of the New Panama Canal Company, which constitution and by-laws have been duly acknowledged before Lefebvre and his colleague, notaries in Paris, under an act of June twenty-sixth, eighteen hundred and ninety-four, that Gautron, acting in his official capacity as receiver for the Universal Company of the Panama Interoceanic Canal, has declared himself as ceding or contributing to the said company newly formed:

First. All rights whatsoever accruing to the old company by virtue of the laws of the Government of the United States of Colombia, dated May eighteenth, eighteen hundred and seventy-eight, and December twenty sixth, eighteen hundred and ninety, as well as those accruing from all decrees, acts, or facts having followed upon these laws in the

course of their execution, and all advantages accruing therefrom and stipulated by these laws and decrees, together with all territory and real estate granted and ceded unto the Interoceanic Company, now in process of liquidation, or acquired by the same; all this provided the new company fulfill the conditions prescribed and imposed by the laws and acts passed in prolongation or extension of the grant, and provided it discharge and pay all sums and indebtedness remaining due to the Colombian Government by the old company.

Secondly. The work already done and accomplished, the yards, workshops, buildings, hospitals, plant, mounted and unmounted, and the stores, etc., belonging to the receivership of the Universal Company of the Panama Interoceanic Canal, as well as all deposits which may have been made by the said company now in process of liquidation.

Thirdly. The plans, estimates, surveys, and specifications, and all documents whatsoever gathered and collected by the Universal Company of the Panama Interoceanic Canal, bearing in any manner on the study, construction, or improvement and operation of the canal and its appurtenants, as well as the privileges attached to the the same. and all contracts or agreements with third parties.

Fourthly. All rights of any nature and description, part ownership, or any other rights whatsoever which may belong or accrue to the Interoceanic Canal Universal Company now being liquidated in the Panama Railroad at Colon, now worked and operated by an American company known as the Panama Railroad Company, whose legal residence is in New York; the said rights being transferred such as they are and exist, carrying with them all the privileges which they entail, and Mr. Gautron binding himself, in his official capacity, to invest with them, the present company, in the form and in compliance with all the formalities required for such due and valid transfer by the laws of the United States of America.

Whereas, moreover, the said rights are to be transferred, as well as the said property, such as they exist and with all that they entail, and whereas these cession, or grant, and contribution have been made by Gautron, in his official capacity, with the following reservations and under the following conditions, to wit:

First. The receivership shall have and receive a share in the net profits and gains of the enterprise, amounting to sixty per cent of the said profits and gains, such as the same shall be determined and computed under articles fifty-one and fifty-two of the constitution and by-laws.

Secondly. Fifty thousand shares of entirely paid-up stock shall be given to the Government of the United States of Colombia, as prescribed by the extension act of December twenty-sixth, eighteen hundred and ninety.

Thirdly. The rights of every nature and description accruing to the receivership from the Panama Railroad and ceded by Mr. Gautron, as set forth in paragraph four above, shall become the property of the new company from the date of the meeting provided for by article seventy-five of the constitution and by-laws. No pecuniary compensation is required of the new company for the cession of these rights, but they are transferred on the condition and with the full understanding that said transfer shall be void if the canal be not completed within the time appointed by the grant. Should the work not be completed

within the said period of time the said rights shall revert to the receivership. If, contrary to all expectations, the meeting in question should fail to take the necessary measures to complete the canal, or if the measures thus taken by the said meeting should prove impossible of execution, the present company would still retain the said rights accruing from the railroad aforesaid; but it would be bound to pay to the receivership a sum of twenty million francs as indemnity, while the receivership's share in the gains and profits of the new company would then be equal to one-half of the said gains and profits without further previous reduction than such as is provided for by paragraphs two and three of article fifty-one. Consequently the said rights shall remain inalienable in the hands of the new company aforesaid either until the payment of the said twenty million francs or until the full completion of the canal.

Fourthly. Until the full completion of the canal, Mr. Gautron shall have power, in his official capacity, to appoint a controlling or supervising committee composed of three members, to be selected as far as possible from among civil engineers and finance inspectors, in order to inspect the progress of the work, the condition and maintenance of the plant and real property, as well as the accounts kept in relation to these various subjects. The compensation of this committee shall be at the expense of the new company.

Whereas, according to the terms of article fifty-one of the constitution and by-laws of the said new company, the annual proceeds of the enterprise shall be used to pay and discharge:

First. The share in the gains and profits stipulated and reserved to itself by the Government of the United States of Colombia, according to the terms of the grant.

Secondly. The costs of maintenance and the operating expenses, the expenditures entailed in the management of the concern, and, generally speaking, all charges incurred by the company, as well as the payment of interest and the redemption of all loans which may have been contracted.

Thirdly. The deduction of one-twentieth levied on the net profits after the settlement and cancellation of all items of indebtedness above enumerated, the said deduction to be applied to the formation of the legal reserve fund.

Fourthly. Five per cent of the capital stock, the same to be applied by the general meeting as the board of directors may advise, both to the formation of the redemption fund, which is to be established under article fifty-five, and to the payment of interest on unredeemed shares.

Whereas, according to the terms of article fifty-two, the net gains and profits of the enterprise will consist in whatever will be left of the annual proceeds after deduction of the various items enumerated in the preceding article hereof, while five per cent of these net profits will be set apart for the benefit of the board of directors, and the surplus shall go: Forty per cent to the shares created and sixty per cent to the Interoceanic Canal Universal Company now in process of liquidation.

Whereas, finally, by the terms of article seventy-five, when the expenses incurred for the work done on the canal and for the settlement of obligations resulting from the contribution made by Gautron in his official capacity as receiver shall have reached a sum equal to at least one-half of the capital stock (excluding nonspecie portions of

the same), the results then achieved from the work already done and the consequent decisions to be taken for the future of the enterprise shall be passed upon by a special technical commission brought together at some previous and opportune time; the said commission to consist of two members designated by the board of directors of the present company and of two persons named by the receivership of the former Universal Company for an interoceanic canal, together with a fifth member whom the other four shall designate and who shall be president of the said commission, but who, in case the other four members should fail to agree, shall be appointed by the president of the tribunal of commerce for the department of the Seine.

Whereas the board of directors shall be bound to make public the report made by this commission, and to summon an extraordinary or special general meeting;

Whereas this meeting shall have to deliberate on ways and means to ensure the completion of the work and on the stipulations hereinabove set forth, article five, paragraph four, number three; whereas the constitution and by-laws in question must be submitted, by the terms of article ten above mentioned, of the law dated July 1st, eighteen hundred and ninety-three, to the tribunal for ratification, touching the contributions intended to be made to the New Panama Canal Company by Gautron in his official capacity, and whereas this ratification is prayed for by Gautron;

Whereas the said contributions are within the competency of the receiver, according to decrees which appointed him with the broadest powers, notably with that of ceding or contributing to a new company all or a part of the company's assets; whereas the conditions stipulated for the benefit of the Universal Company of the Panama Interoceanic Canal seem to be in accord with its own interests, and therefore it is proper to ratify and approve the agreement declaring these contributions and conditions;

For these reasons the court, leaving unimpaired the right of shareholders, of the attorney or representative of obligation holders, and of other creditors of the company to intervene and make objection under article eleven of the law dated July first, eighteen hundred and ninety-three,

Does hereby approve and ratify, purely and simply, the constitution and by-laws of the New Panama Canal Company, as received by Lefebvre and his colleagues, notaries, in Paris, on the twenty-sixth day of June, eighteen hundred and ninety-four, touching the contributions made by Gautron in his capacity as receiver of the Universal Company of the Panama Interoceanic Canal, and the court hereby orders that the present decree be published within the space of ten days in the "Journal Officiel" and in the "Journal Officiel (Commune edition)," according to article eleven of the law of July first, eighteen hundred and ninety-three.

Signed: Baudouin, de Boislisle, and Lasnier. Done and adjudged by Messrs. Baudouin, president; de Boislisle, vice-president; Laporte, judge; Tassart, supernumerary judge; Le Berquier, supernumerary judge. In the presence of Monsieur Cabat, assistant attorney for the commonwealth, attended by Lasnier, clerk, June twenty-ninth, eighteen hundred and ninety-four.

The order was signed by the honorable president of the court, by the reporting judge, and by the clerk.

Recorded in Paris July eleventh, eighteen hundred and ninety-four, folio fifty, third subdivision. Received nine francs and thirty-eight centimes, decimes included.

Senator KITTREDGE. You have a copy of that charter, have you, here?

Senator MORGAN. Yes; we have that and a translation by the State Department.

Mr. PASCO. The New Panama Company was organized under the general laws of France in October, 1894; on the 29th day of June, 1894, the receiver was authorized to contribute to it all of this canal property. That was done, and then there was an order confirming his action. The former order of June 29, 1894, was upon condition that the matter should be afterwards submitted to the court for confirmation.

Senator KITTREDGE. Have you a copy of the decree?

Mr. PASCO. Here is a copy of the decree of confirmation, dated August 8, 1894, which I will leave with you. It shows that all of the parties came before the court and stated their objections or their acquiescence, and then after a hearing the court confirmed the act of the liquidators in transferring to the new canal company all the property of the old.

Senator MORGAN. You have a copy of that?

Mr. PASCO. Yes.

Senator MORGAN. Let us have it put in the record.

Mr. PASCO. This is not among the appendices, because I was unable to get hold of it when the report of the Commission was prepared, but since that time I have obtained a copy.

The CHAIRMAN. What is the date of that?

Mr. PASCO. This is dated August 8, 1894.

The decree is as follows:

[Translation.]

Decree upon the interventions to the decree confirming the articles of incorporation.

CIVIL TRIBUNAL OF THE SEINE.

FIRST CHAMBER, August 8, 1894.

The court consolidates the causes, in view of their connection, and adjudicating the whole by one and the same decree.

Adjudging in the first place:

It being considered that by the terms of article 5 of the articles of incorporation of the company formed for the completion of the Panama Canal, according to the deed executed on June 26, 1894, before Lefebvre and his colleague, notaries at Paris, Gautron, in his capacity of receiver of the Compagnie Universelle du Canal Interocéanique de Panama, declared that he contributed to the new company, under the conditions set forth in said articles of incorporation, to wit:

First. All rights accruing to the company in liquidation from the laws of the Government of the United States of Colombia, dated May 18, 1878, and December 26, 1890, as well as from any decrees, acts, or things whatever which have occurred in the execution of these laws with all the advantages provided by these laws, together with all lands and real estate granted to the company in liquidation or acquired by it.

All subject to the fulfillment of the conditions of the laws and extensions of the concessions, and to the payment of all sums remaining due from the receiver to the Colombian Government.

Second. The works executed and under execution, workshops, buildings, hospitals, plant erected and not erected, materials and supplies, etc., belonging to the *Compagnie Universelle du Canal Interocéanique* in liquidation, as well as all deposits as security made by said company in liquidation.

Third. The plans, estimates, studies, documents of every nature collected by the *Compagnie Universelle du Canal Interocéanique*, relating in any manner to the study, execution, or exploitation of the canal or its dependencies, as well as the benefit of all agreements with all third persons.

Fourth. The rights of every nature, part interests, and, generally, any others whatsoever which may belong to the *Compagnie Universelle du Canal Interocéanique* in liquidation, in the railroad from Panama to Colon, operated by an American company called the Panama Railroad Company.

That with the purpose of taking part, if need be, in the subscription to the capital stock of the company which is to complete the work, and to insure his possession of the funds necessary for the payments which he would have to make in that case, Gautron has asked the financial aid of the "*Société Générale pour favoriser le développement du commerce et de l'industrie*," of the "*Crédit Lyonnais*," and of the "*Société de crédit industriel et commercial*;" that by agreement under seal, dated June 26, 1894, recorded, these three establishments have promised, in each case, to purchase from him, each in a proportion agreed, at the price of 90 francs each, lottery bonds of the *Compagnie du canal interocéanique*, full paid, up to a maximum of 545,000 bonds.

That, finally, by the terms of an agreement entered into on January 26, 1894, between the receivers of the Panama company, the representative of the bondholders, and Gustave Eiffel, and by which the last named bound himself to subscribe for shares up to the sum of ten millions in any new company having for its object the reorganization of the Panama work, it was agreed that, in case this subscription should in fact be made, Eiffel should receive, in payment for drafts of which he is the holder, for work done on behalf of the receivership, a corresponding amount of full-paid lottery bonds at the rate of 125 francs per bond; that in case, on the other hand, a new company should not be formed, Eiffel bound himself to pay to the receivership the net amount of 5,000,000 francs and to surrender the drafts, the receivership, for its part, surrendering to him 5,755 tons of iron and castings remaining in its stores.

It being considered that, in accordance with the decree of this chamber dated June 29, 1894, recorded, the court did, on petition of Gautron, as receiver, confirm the agreements hereinbefore set forth in so far as they involve the first, a contribution by the receivership to the company for completion of the work, and the two others, sales of assets.

That these decrees were published in the "*Journal Officiel*" and the "*Journal Officiel*" (edition des communes) of July 1, 1894.

That an intervention has been filed by Lemarquis, representative of the bondholders, and by Couailler, a shareholder of the *Compagnie universelle* and a holder of bonds of that company.

That Muracciole, a creditor of the receivership, has intervened on the intervention of Couailler, with whom he states that he unites.

That Duhamel and others, as bondholders, have also intervened on the said intervention, praying that it be rejected.

It being considered that said interventions are properly filed under the provisions of the act of July 1, 1893.

Upon the merits:

As to the intervention of Lemarquis in his official capacity:

It being considered that its only purpose is to preserve the rights of the bondholders and to enable them to intervene, if they think fit.

That with the exception of Couailler, holder of only three bonds, none of them has felt called upon to avail himself of this opportunity.

That it appears from the documents collected by Lemarquis, and especially from the correspondence of the bondholders, that the latter are, by a very large majority, in favor of the proposed combination; that a wholly insignificant number of these bondholders desire a distribution of the assets, which distribution would only give a very small dividend to each party in interest and must necessarily entail the lapsing of the concession, the final abandonment of the enterprise, and the loss, without compensation, of the work already completed, of the assets in real estate, and of the greater part of the personal property.

That, under these circumstances, Lemarquis might properly consider himself authorized to join in the prayer of Gautron for confirmation, which he did at the hearing.

As to the intervention of Couailler:

It being considered that, far from calling for a distribution of the assets and opposing a continuation of the canal enterprise, Couailler declares himself ready to join any combination of a character to bring about its completion.

That he maintains that this end might only be attained with the resources of the receivership alone, without the necessity for divesting himself of a part of its assets for the benefit of a new company, the legality and advantages of which divesting he contests, especially in so far as it concerns the rights of the receivership in the railroad from Panama to Colon, and the conditions of which he criticises.

It being considered that none of the combinations attempted since 1889 for the reorganization of the Panama work has succeeded; that it would be, therefore, idle to consider whether any of them would have been more advantageous if it had been possible to carry it out.

That by the very force of circumstances, and having regard to the imminence of the date fixed for lapse of the concession, the confirmation of the contracts submitted to the court can alone prevent this lapse.

That if the receiver were to resume the work at the risk of the receivership, as the intervenors appear to call upon him to do, he would plainly exceed the powers which the decrees appointing him and the act of July 1, 1893, have conferred upon him; that he would in that way inevitably absorb all the resources of the receivership, and would expose himself to certain failure, since the canal can not be finished without a further appeal to credit, which a dissolved company could not make with any chance of success.

That, on the other hand, the contracts for contribution and sale of assets, the confirmation of which is sought, are within the powers of the receiver; that their legality can not be seriously contested.

That their timeliness is no less evident.

That the previous attempts have all failed because of the obstacles which their authors met in collecting the capital necessary for a resumption of the work; that, as it would be chimerical, before such resumption and without awaiting the demonstration, by a practical trial, of the possibilities of completing the work, to expect outside aid, which will continue to hold back or to make unacceptable exactions of the receivership, so it is just to suppose that this trial will give rise to renewed confidence and will induce further sacrifices of the national savings; that, therefore, there can be no ground of complaint against the receiver for having devoted to the work undertaken by the new company a part of the resources of the receivership and having furthermore interested in its success the financial institutions whose help will be necessary for new appeals to credit.

It being considered that, concerning especially the contribution of the rights over the railroad from Panama to Colon, it is the essential condition and basis of the new combination, not only because of the necessary correlation of the two enterprises, but also because it insures a legitimate return to the capital of the new company, in case the completion of the canal should be finally abandoned.

That it is important to observe that the transfer of these rights is only conditional; that they will revert to the receivership if, the completion of the canal having been decided upon by the stockholders meeting, it could not be finished within the period fixed by the concession; that this clause of defeasance completely guarantees, under the circumstances supposed, the interests of the receivership, and that no criticism can be, nor, indeed, is made of the articles of incorporation on this point.

That if these rights should remain the property of the new company, in case the stockholders' meeting should not make the provision necessary for the completion of the canal the receivership will receive, under the circumstances supposed, not only, as the intervenor appears to think, an indemnity of 20,000,000, but also one-half the profits.

That the only deductions authorized, in that case, being expenses of maintenance and operation and expenses of management, and the reservation of one-twentieth for the reserve fund, the share of the new company, out of the revenues of the railroad will not exceed that paid to the receivership.

That there is the less fear that the company will for so insignificant a remuneration give up the completion of the canal to confine itself to the operation of the Panama Railroad, that the works and the annuities paid to the Colombian Government will at that time have absorbed all or the greater part of its cash capital, so that the company would find that it had bought for nearly 80,000,000 half the revenue of the railroad; that the apprehension manifested by Couailler is therefore unfounded.

That the rights in the Panama Railroad were, it is true, bought by the Panama Company for 90,000,000, but it is certain that this price had been considerably increased by speculation, as the income of the railroad had been artificially increased; that, if it is reasonable to expect a remunerative revenue in the future, it is none the less demonstrated that the sale, in a lump, of half this income for 20,000,000 is an operation quite to the advantage of the receivership.

That it should be recalled, moreover, that the receiver, apart from the influence and the share of the profits which may, if earned, belong

to him as a subscriber, has secured, by a number of provisions of the most precise character, the means of effectually overseeing all the operations of the new company; that, not to speak of the commission of control, provided by article 5, paragraph 4, he has reserved to himself the appointment of half the members of the technical commission; that, finally, the prohibition of the sale of shares until they are full paid and the limit upon the number of votes given each shareholder in the stockholders' meetings appear sufficiently to protect these meetings against speculation; that the representative of the bondholders, nevertheless, thought it proper further to strengthen the guaranties afforded by the articles of incorporation to the receivership, and that he obtained from the principal subscribers, notably the credit companies and Eiffel, an agreement not to transfer nor negotiate their shares until the commission provided by article 55 of the articles of incorporation should have made its report and the stockholders' meeting should have decided to continue or stop the works.

That this agreement should be recognized as procured by Lemarquis.

With regard to the undertaking of the credit companies to purchase lottery bonds:

It being considered that, if the agreed price of 90 francs is less than the rates quoted at present, it is enough to refute the objection which the intervenor undertakes to draw from this circumstance, to observe that the rates on the exchange, subject to the fluctuations of speculation, could not serve as a basis for a sale in a lump of a considerable amount of securities not yet issued.

Nor can the price imposed upon Eiffel by the agreement of January 26, 1894, be adopted as a basis for comparison, the difference between the figure of 125 francs fixed by this agreement and the market price at the time being one of the advantages granted the receivership.

That, on the other hand, there is no reason to consider the objection in principle based on the act of July 15, 1889, the prohibition which is invoked not being applicable to the receivership, which is, on the contrary, expressly authorized to issue bonds without limitation as to price and without interest.

That it should be observed, finally, that the receiver remains free not to take advantage of the unilateral agreement made by the credit companies if the capital of the new company can be made up without their aid, and, on the other hand, that the interests of the bondholders are protected by the right of preference which has been reserved to them.

That the supplementary agreement of June 26, 1894, is, therefore, wholly in their favor.

With regard to the transaction with Eiffel:

It being considered that it was confirmed upon the concurrent opinion of three jurisconsults appointed by the attorney for the Republic; that after a thorough examination of the claim in connection with which it was made they considered that this transaction was to the advantage of the receivership; that this opinion was shared by the members of the council, whose opinion, upon this point, is not subject to review; that articles 10 and 11 of the act of July 1, 1893, do not, in fact, authorize intervention except with regard to the provisions involving transfer of assets, to wit, the issue of lottery bonds in payment and the surrender of material; that these provisions are not the subject of any criticism on the part of the intervenor.

That the latter plainly confuses matters when he characterizes as

illusory a debt contracted, not by the Panama Company, but by the receivership, in reliance upon and for the benefit of which Eiffel had continued his work after the dissolution of the company.

That if the act of July 1, 1893, required the deposit of the proceeds of transactions in the Caisse des consignations it did not forbid the receiver to take other things than cash in payment, and certainly not to stipulate, for his own benefit, for the privilege of paying his own debt by the issue of securities.

That in fact the method of settlement adopted is, as has been said above, to the advantage of the receivership; that there is, consequently, no reason to reconsider, even on this point, the confirmation ordered by the decree of June 29.

With regard to the intervention of Muracciole:

It being considered that the intervenor, a creditor of the Compagnie Universelle de Panama, by reason of a judgment of April 11, 1883, contends that the entire assets are and should remain a security for creditors, without the receiver, representing shareholders only, being allowed to dispose of them, and especially to make them subject to the chances of a new enterprise; that he opposes, for this reason, the carrying out of the agreements made by Gautron.

It being considered that this contention is contrary as well to the letter as to the spirit of the act of July 1, 1893; that this act in principle authorized the receiver to make, under conditions which it fixed, all efforts and all conversions of assets; that it did not intend that creditors should be able to prevent these acts, and that it was for the express purpose of preventing them from doing so that it suspended their suits and executions.

That there is therefore no reason to consider further the intervention of Muracciole.

With regard to the intervention of Duhamel and associates:

It being considered that there is cause, for the reasons hereinbefore stated, for granting their prayer for the rejection of the intervention.

For these reasons:

Admits in due form Lemarquis and Couailler as intervenors on the decree of June 29, 1894.

Recognizes Muracciole, and Duhamel and others on their intervention.

Upon the merits:

Declares the interventions of Lemarquis, Couailler, and Muracciole unsupported.

Orders that said decrees have full effect.

Recognizes, nevertheless, as due to Lemarquis, the undertaking of the credit companies, Eiffel and others relative to the time when the shares subscribed for by them may be sold.

Applies to Couailler, Muracciole, and Lemarquis, in his official capacity, article 479 of the code of civil procedure.

Accordingly imposes upon each of them a fine of 50 francs.

Combines all expenses, including costs, on the intervention of Duhamel and associates.

Imposes one-third of said expenses each on Couailler and Muracciole.

Directs that the remaining third be borne by Lemarquis in his official capacity.

Senator KITTREDGE. To come back to the question that I asked you, my understanding, from something you said or from an examination of some papers, is that the liquidator filed that petition with that court,

setting forth the character of the contract and the arrangement he proposed to have with the New Panama Company, and thereupon that court made a decree authorizing him to make a transfer of the property in accordance with the terms of that contract. Am I right about that?

Mr. PASCO. That is substantially the case. The points urged by the receiver are stated in the decree.

Senator KITTREDGE. Then after the arrangement with the new company was carried out there was an order confirming it?

Mr. PASCO. There was an order confirming it.

Senator KITTREDGE. Confirming what had been done?

Mr. PASCO. Yes; that is the order I have just read.

Senator KITTREDGE. What was the next step taken?

Mr. PASCO. The next step was the organization of the company. That was in October, 1894.

Senator KITTREDGE. And the receiver of the old Panama Company became interested in the new company in accordance with the authority given by the court and the decree confirming the transfer of the property to the new company. Is that right?

Mr. PASCO. Do you refer to his interest as a stockholder?

Senator KITTREDGE. No.

Mr. PASCO. He did become a stockholder, as liquidator or receiver of the old company. He became a stockholder in that way.

Senator KITTREDGE. Was that provided for or authorized in the decree of court you have mentioned?

Mr. PASCO. It was provided for in the decree. It was based upon the law. The decree says:

"Appoints Mr. Joseph Brunet receiver of said company with the broadest powers, especially to grant or to contribute to any new company all or a part of the corporate assets"—

He contributed to the corporate assets the money which was represented by those shares. He also contributed the entire property of the old canal company, and it is covered by section 10 of the law of July 1, 1893, and covered by the order of the court which was made in harmony with that.

Senator MORGAN. Who made that contribution?

Mr. PASCO. The liquidator.

Senator MORGAN. There have been three. Which one of them was it?

Mr. PASCO. I am not sure which individual it was. There have been three or four. It is made officially, and it is in the name of the liquidator of the company.

Senator MITCHELL. Has he ever become an individual stockholder in the new company?

Mr. PASCO. No; we have a list of the original stockholders and his name does not appear among them, and I do not think he became an individual stockholder. There are some small stockholders whose names are not given, but I refer you to the page of our report where all these stockholders are named. They are found on page 84 of the report of the Isthmian Canal Commission. The liquidator is put down as subscribing to the amount of 15,895,000 francs.

Senator KITTREDGE. What was the next step taken as affecting the title of this property?

Mr. PASCO. Well, there were several steps taken in the way of continuing the concessions.

Senator KITTREDGE. I am not referring to the concessions, but what was the next step of the court?

Mr. PASCO. The company was clothed with authority then, through its concessions, to construct a canal, and given until 1910 to complete it, and it went on with the work, and that is its present status.

Senator MORGAN. Have you a copy of that third extension?

Mr. PASCO. I haven't it with me, but I will include it in my testimony.

Senator MORGAN. Was that the second or the third?

Mr. PASCO. The third extension and the fourth contract. The second and third extensions were made to the receiver, and the fourth one to the new company.

Senator MORGAN. I want that to go into the record as a part of your testimony.

Mr. PASCO. Yes.

The document referred to is as follows:

[Translation.—Diario Oficial; Bogota, May 7, 1900.]

Contract relative to the granting of an extension of time to the New Company of the Panama Canal.

Whereas the national executive power has dictated the following decree, No. 721, of 1900 (April 23), by which provision is made for the granting of an extension of time to the New Company of the Panama Canal, the President of the Republic having seen the memorial by which the New Company of the Panama Canal has solicited of the Government an extension of six years for the completion of the work and putting it into public service, and having seen the communications in which the special agent, Dr. Nicolas Esquerro, expounds to the Government to public expediency of granting the extension herein considered, decrees:

ART. 1. The Government may grant to the New Company of the Panama Canal an extension for the fixed term of six years to complete the work and put it into public use, provided that it shall deposit at the disposition of the national treasury, within one hundred and twenty days, computed from the date on which this instrument shall be notified to the said company, in such bank or establishment as may be designated by the Government, five millions of francs (frs. 5,000,000) in French gold.

ART. 2. The said extension will begin to run on the 31st day of October, 1904. Consequently the canal must be completed and put into public use on the 31st day of October, 1910, at the latest.

Let it be communicated and published.

Given at Pena, Department of Cundinamarca, this 23d day of April, 1900.

MANUEL A. SANCLEMENTE,

RAFAEL M. PALACIO,

The Minister of State.

CARLOS CUERVO MARQUEZ,

The Minister for Foreign Affairs.

CARLOS CALDERON,

The Minister of Finance.

JOSÉ SANTOS,

The Minister of War.

MORCO F. SUAREZ,

The Minister of Public Instruction.

MARCELIANO VARGAS,

The Minister of the Treasury.

Now, therefore, we, to wit, Carlos Calderon, minister of finance of the Republic, duly authorized by the executive power, on the one part, and, on the other part, Alejandro N. Mancini, in his capacity of agent of the new company of the Panama Canal and as representative of the same, by virtue of the power of attorney which he has laid before the ministry of finance, have executed the following contract:

ART. 1. The Government of the Republic grants to the new company of the Panama Canal a delay of six years from the 31st of October, 1904, in which to complete the work on the canal and deliver it to the public service, under the terms of the existing contracts. In consequence the said work shall have to be completed and put into the public service on the 31st day of October, 1910.

ART. 2. In consideration of the extension referred to in the foregoing article, the new company of the Panama Canal will pay to the Republic the sum of five millions of francs (francs 5,000,000) in French coin, in the city of Paris, ninety days from the date on which this contract shall have been approved by the most excellent President of the Republic. Said payment shall be made by the company to the firm or bank in the city of Paris in whose favor the minister of the treasury of the Republic may draw.

ART. 3. This contract requires the approval of the council of ministers and that of the most excellent President of the Republic.

In witness whereof, we have signed three copies of even tenor at Bogota, this twenty-fifth day of April, one thousand nine hundred.

CARLOS CALDERON.

ALEJANDRO N. MANCINI.

PRESIDENCY OF THE COUNCIL OF MINISTERS,
Bogota, April 25, 1900.

In the session of this day the foregoing contract was examined and unanimously approved.

CARLOS CUERVO MARQUEZ,
The President.

ALEJANDRO M. OLIVARES,
The Secretary ad hoc.

NATIONAL EXECUTIVE POWER,
PENA, DEPARTMENT OF CUNDINAMARCA,
April 26, 1900.

Approved.

MANUEL A. SANCLEMENTE.
CARLOS CALDERON,
The Minister of Finance.

Senator KITTREDGE. You have made reference to the order of the court made last August. Was that the next step, now, to take up the recent proceedings that have taken place?

Mr. PASCO. The next step was the application to the court which resulted in the order of August 2, 1901.

Senator MORGAN. Have you that application?

Mr. PASCO. It is included in the papers recently sent to the committee by Admiral Walker.

(The package was handed to witness.)

the same), the results then achieved from the work already done and the consequent decisions to be taken for the future of the enterprise shall be passed upon by a special technical commission brought together at some previous and opportune time; the said commission to consist of two members designated by the board of directors of the present company and of two persons named by the receivership of the former Universal Company for an interoceanic canal, together with a fifth member whom the other four shall designate and who shall be president of the said commission, but who, in case the other four members should fail to agree, shall be appointed by the president of the tribunal of commerce for the department of the Seine.

Whereas the board of directors shall be bound to make public the report made by this commission, and to summon an extraordinary or special general meeting;

Whereas this meeting shall have to deliberate on ways and means to ensure the completion of the work and on the stipulations hereinabove set forth, article five, paragraph four, number three; whereas the constitution and by-laws in question must be submitted, by the terms of article ten above mentioned, of the law dated July 1st, eighteen hundred and ninety-three, to the tribunal for ratification, touching the contributions intended to be made to the New Panama Canal Company by Gautron in his official capacity, and whereas this ratification is prayed for by Gautron;

Whereas the said contributions are within the competency of the receiver, according to decrees which appointed him with the broadest powers, notably with that of ceding or contributing to a new company all or a part of the company's assets; whereas the conditions stipulated for the benefit of the Universal Company of the Panama Interoceanic Canal seem to be in accord with its own interests, and therefore it is proper to ratify and approve the agreement declaring these contributions and conditions;

For these reasons the court, leaving unimpaired the right of shareholders, of the attorney or representative of obligation holders, and of other creditors of the company to intervene and make objection under article eleven of the law dated July first, eighteen hundred and ninety-three,

Does hereby approve and ratify, purely and simply, the constitution and by-laws of the New Panama Canal Company, as received by Lefebvre and his colleagues, notaries, in Paris, on the twenty-sixth day of June, eighteen hundred and ninety-four, touching the contributions made by Gautron in his capacity as receiver of the Universal Company of the Panama Interoceanic Canal, and the court hereby orders that the present decree be published within the space of ten days in the "Journal Officiel" and in the "Journal Officiel (Commune edition)," according to article eleven of the law of July first, eighteen hundred and ninety-three.

Signed: Baudouin, de Boislisle, and Lasnier. Done and adjudged by Messrs. Baudouin, president; de Boislisle, vice-president; Laporte, judge; Tassart, supernumerary judge; Le Berquier, supernumerary judge. In the presence of Monsieur Cabat, assistant attorney for the commonwealth, attended by Lasnier, clerk, June twenty-ninth, eighteen hundred and ninety-four.

The order was signed by the honorable president of the court, by the reporting judge, and by the clerk.

Recorded in Paris July eleventh, eighteen hundred and ninety-four, folio fifty, third subdivision. Received nine francs and thirty-eight centimes, decimes included.

Senator KITTREDGE. You have a copy of that charter, have you, here?

Senator MORGAN. Yes; we have that and a translation by the State Department.

Mr. PASCO. The New Panama Company was organized under the general laws of France in October, 1894; on the 29th day of June, 1894, the receiver was authorized to contribute to it all of this canal property. That was done, and then there was an order confirming his action. The former order of June 29, 1894, was upon condition that the matter should be afterwards submitted to the court for confirmation.

Senator KITTREDGE. Have you a copy of the decree?

Mr. PASCO. Here is a copy of the decree of confirmation, dated August 8, 1894, which I will leave with you. It shows that all of the parties came before the court and stated their objections or their acquiescence, and then after a hearing the court confirmed the act of the liquidators in transferring to the new canal company all the property of the old.

Senator MORGAN. You have a copy of that?

Mr. PASCO. Yes.

Senator MORGAN. Let us have it put in the record.

Mr. PASCO. This is not among the appendices, because I was unable to get hold of it when the report of the Commission was prepared, but since that time I have obtained a copy.

The CHAIRMAN. What is the date of that?

Mr. PASCO. This is dated August 8, 1894.

The decree is as follows:

[Translation.]

Decree upon the interventions to the decree confirming the articles of incorporation.

CIVIL TRIBUNAL OF THE SEINE.

FIRST CHAMBER, *August 8, 1894.*

The court consolidates the causes, in view of their connection, and adjudicating the whole by one and the same decree.

Adjudging in the first place:

It being considered that by the terms of article 5 of the articles of incorporation of the company formed for the completion of the Panama Canal, according to the deed executed on June 26, 1894, before Lefebvre and his colleague, notaries at Paris, Gautron, in his capacity of receiver of the Compagnie Universelle du Canal Interocéanique de Panama, declared that he contributed to the new company, under the conditions set forth in said articles of incorporation, to wit:

First. All rights accruing to the company in liquidation from the laws of the Government of the United States of Colombia, dated May 18, 1878, and December 26, 1890, as well as from any decrees, acts, or things whatever which have occurred in the execution of these laws with all the advantages provided by these laws, together with all lands and real estate granted to the company in liquidation or acquired by it.

Whereas, in consequence of the death of Achille Monchicourt, Gautron remained the only liquidator; whereas, from the documents submitted, it appears that it is necessary to authorize Gautron to consent to a compromise in compliance with his request.

For these reasons:

Authorizes Gautron, in his official capacity, to consent to a compromise with the Nouvelle Compagnie du Canal de Panama upon all litigious questions which might arise relating—

Firstly. To the determination of the price and the conditions to be proposed to the eventual purchaser of the concession and the canal works, and all the assets of the new company.

Secondly. To the division of the proceeds of the sale, if that sale should be effected, between the new company and the liquidation of the Panama Canal.

LAPORTE, LE BERQUIÉR, and FLOQUET.

Ordered and decreed in the chamber of the council of the civil tribunal of the first instance of the department of the Seine, sitting in the palace of justice, in the city of Paris, by Laporte, president; Berquier, judge; Planchenault, special judge, in the presence of Mr. Pezous, substitute for the attorney for the Republic, assisted by Floquet, clerk.

August 2, 1901.

In consequence, etc.:

The minute was signed by the president, the reporting judge, and the clerk.

Recorded at Paris, the nineteenth of August, one thousand nine hundred and one, folio ninety-four.

Division first, received nine francs thirty-eight centimes, decimes included.

VARINOT.

A true copy.

FLOQUET.

[First certification.]

Seen by us, C. des Etangs, judge for certification of the signature of M. Floquet, clerk, on account of inability of M. the president of the tribunal of first instance of the Seine.

Paris, the 13 January, 1902.

[SEAL.]

C. DES ETANGS.

[Second certification.]

Seen for certification of the signature of M. des Etangs, written on the other side.

Paris, the 13 January, 1902.

By authority of the keeper of the seals, minister of justice, the sub-chief of bureau:

[SEAL.]

DE LA GUETT.

[Third certification.]

The minister of foreign affairs certifies genuine the signature of M. de la Guett.

Paris, the 13 January, 1902.

For the minister, for the authorized chief of bureau.

[SEAL.]

E. CARPEL.

[Fourth certification.]

U. S. CONSULATE-GENERAL, *Paris*.

The seal of the ministry of foreign affairs and the signature of Mr. E. Carpel are certified to be genuine.

January 13, 1902.

[SEAL.]

E. P. MACLEAN,

U. S. Vice-Consul-General, Paris.

Mr. PASCO. I am informed that the practice in a case of this kind is for the attorney for the Republic to examine the case and see whether it is in proper condition for action, and if so it is referred to the vice-president of the tribunal.

Senator MORGAN. What tribunal is that? The tribunal of commerce?

Mr. PASCO. This is the civil tribunal. That step was taken, as appears by the statement following the petition.

Then follow the other proceedings set forth in the decree. No price is fixed for the property, but the decree authorizes the receiver to agree upon a price and to enter into an arrangement for a division of the purchase money between the New Panama Company and the liquidator representing the interests of the old company.

Senator MITCHELL. Was there no condition at all in that decree to the effect that the transferee should proceed to construct the canal?

Mr. PASCO. There are no conditions at all. It provides for an absolute sale and transfer.

Senator MORGAN. What is the next paper?

Mr. PASCO. The next paper is the agreement that was made in accordance with the order of the court.

Senator KITTREDGE. Between whom?

Mr. PASCO. Between the New Panama Canal Company and the liquidator. It was an arrangement made for the distribution of the proceeds of the sale when made. It was arranged that the proceeds should be divided by a court of arbitration.

Senator MORGAN. That paper should be included in the record.

The paper is as follows:

[Translation.]

Agreement between the Compagnie Nouvelle du Canal de Panama and the liquidation of the Compagnie Universelle du Canal Interocéanique.

Between the undersigned: First, Mr. Jean Pierre Gautron, acting in his capacity of liquidator of the Compagnie Universelle du Canal Interocéanique de Panama; second, The Compagnie Nouvelle de Panama, represented by Messrs. Marius Bô and Monvoisin, directors, by virtue of a resolution of the board of directors dated December 23, 1901:

It has been stated and agreed as follows:

STATEMENT.

By the terms of article 52 of the by-laws of the New Panama Canal Company, "the profits of the enterprise, such as had been determined by article 51, were to be divided between the stockholders of the New Panama Canal Company and the liquidation of the Compagnie Universelle de Panama in the proportion of 40 per cent to the former and 60 per cent to the latter."

As negotiations may be opened for the sale of the Panama Canal enterprise to the Government of the United States of North America, a sale which would modify profoundly the conditions of its contribution to the enterprise, the liquidation of the Compagnie Universelle has held: First. That these negotiations could not be carried on without its intervention. Second. That the price of the sale could not be fixed except in agreement with the liquidation. Third. That the share to go to the liquidation in the said proceeds should be larger than the proportion fixed by article 52, on account of the damage suffered by the liquidation from the fact of the sale and the consequent abandonment of its rights to the eventual future profits of the enterprise.

While maintaining a contrary opinion upon these three points, the new company has admitted that, as a matter of fact, in default of a previous agreement with the liquidation, there might be difficulty in bringing the negotiations to a successful conclusion. It therefore proposed that the direction of the negotiations and the power to treat should be accorded to the new company, remarking, on the one hand, that they could with difficulty be conducted by two persons, and, on the other hand, that the pecuniary interests of the company; which, moreover, appears as alone invested with ownership, so far as third parties are concerned, gave all necessary guaranty to the liquidation for the conduct of the negotiations and their eventual conclusion; and it offered to submit to the decision of a tribunal of arbitration the third claim of the liquidation of the Compagnie Universelle.

Coinciding with these views, Mr. Gautron, liquidator of the Compagnie Universelle, in accord with Mr. Lemarquais, the judicial representative of the bondholders, on the one hand, and the New Panama Canal Company, on the other hand, have, under the advice of their counsel, entered into the following agreement:

AGREEMENT.

ARTICLE 1. The New Panama Canal Company alone remains charged with carrying on the negotiations. It shall have full powers to conclude eventually with the Government of the United States and to fix, after discussion with it, the price and conditions of the sale.

ART. 2. A tribunal of arbitration is hereby appointed, charged, from now on, with determining the proportions in which the proceeds of the sale shall be assigned to the New Panama Canal Company and to the liquidation of the Compagnie Universelle.

This tribunal of arbitration shall be composed of five members.

ART. 3. The new company designates Messrs. Du Buit and Léon Devin; Mr. Gautron, in his official capacity, designates on his side Messrs. Limbourg and Henri Thieblin.

The two parties have agreed to designate as fifth arbitrator Mr. Betolaud, late chairman of the bar association.

ART. 4. The arbitrators shall render their decision within the month which will follow the convening of the tribunal of arbitration.

They are freed from the rules and forms of procedure. They shall decide as amicable arbitrators, without appeal or recourse to the supreme court.

ART. 5. The present agreement is made:

First. So far as concerns the liquidator of the old company, by virtue of the authority to compromise, which was conferred upon him

by the judgment of the Chamber of the Council of the Civil Tribunal of the Seine, dated August 2nd, 1901.

Second. So far as concerns the new company, by virtue of the powers which article 28 of the by-laws confers upon the board of directors, but subject to the final approval by the general meeting of shareholders of the conditions of the transfer to the United States Government.

Done in duplicate at Paris the 24th of December, 1901.

Read and approved.

M. BÔ.

Read and approved.

GAUTRON.

Read and approved.

F. MONVOISIN.

Extract of the minutes of the meeting of December 23, 1901.

Present: Mr. Bô, Mr. Bourgois, Mr. Couvreur, Mr. Forot, Mr. Gueydan, le Baron de Lassus St. Geniès; Mr. Georges Martin, Mr. Monvoisin, Mr. Rischmann, Mr. Terrier, Mr. Samper, representing the Colombian Government.

The board, after discussion, resolves, unanimously, to enter into the proposed agreement with Mr. Gautron, liquidator of the Compagnie Universelle, and gives all powers to Messrs. Bô and Monvoisin to sign same agreement.

Bô, *President Board of Directors.*

CONSULATE-GENERAL OF THE UNITED STATES OF
AMERICA FOR THE REPUBLIC OF FRANCE,
At the City of Paris.

On the fourteenth day of January, A. D. 1902, before me, John K. Gowdy, consul-general of the United States of America at Paris, France, residing therein, duly commissioned and qualified, personally appeared Marius Bô, president of the Compagnie Nouvelle de Panama, Fernand Monvoisin, vice-president of the Compagnie Nouvelle de Panama, and Jean Pierre Gautron, liquidator de l'ancienne Cie du Canal Interoceanique de Panama, to me known, and known to me to be the individuals described in and who executed the within instrument, and severally acknowledged to me that they executed the same freely and voluntarily for the uses and purposes therein mentioned, as and for the act and deed of the above companys as therein expressed, and as such liquidator.

In testimony whereof I have hereunto set my hand and affixed the seal of the consulate-general of the United States of America at Paris, aforesaid, the day and year above written.

[SEAL.]

JOHN K. GOWDY,
United States Consul-General.

Senator KITTREDGE. See if I understand the situation correctly. After the old company went into the hands of the receiver an application was made by the liquidator to the court, authorizing him to transfer the property of the old Panama company to the new company. Is that right?

Mr. PASCO. That is right.

Senator MORGAN. That paper is not amongst those you have sent to the committee?

Mr. PASCO. No. Do you wish me to include it in my testimony?

Senator MORGAN. Yes.

(The application is included in the proceedings before the civil tribunal when the order of June 29, 1894, was made and the paper containing these proceedings has already been submitted in this examination.)

Senator KITTREDGE. Then the court, acting upon that application, made a decree authorizing the transfer of the properties to the new company?

Mr. PASCO. After the confirmation.

Senator KITTREDGE. They made an order approving it?

Mr. PASCO. Yes.

Senator MORGAN. Based upon that application?

Mr. PASCO. Yes.

Senator MORGAN. Is that paper in the record?

Mr. PASCO. That is the decree of August 8, 1894, which has already been submitted.

Senator KITTREDGE. And then last August the liquidator of the old company applied to the same court for the permission to make a different disposition?

Mr. PASCO. Yes.

Senator KITTREDGE. Of his interest in the new Panama company, and the properties of the old Panama company, a different disposition than that contemplated by the former order or decree of the court?

Mr. PASCO. Yes.

Senator MORGAN. Is that paper in the record?

Mr. PASCO. I have put that in.

Senator KITTREDGE. And the court approved of that application?

Mr. PASCO. Yes.

Senator KITTREDGE. Now, upon the subject of concessions.

Mr. PASCO. The next paper which I have here shows that at a meeting of the New Panama Canal Company on December 23, 1901, a new president and new vice-presidents were chosen. Before that comes in there is another paper here, an extract from the minutes of the annual general meeting of the shareholders of the New Panama Canal Company held December 21, 1901, which recites that the general meeting, having heard the report of the board of directors, gives its approval to the conclusions of said report and gives full power to the directors to negotiate the transfer, concessions, privileges, etc., of the company, and to deal, subject to the ratification of the shareholders. That is signed by the new president, M. Bô.

The two papers are as follows:

[Translation.]

Extract of the minutes of the meeting of December 23, 1901.

Present: Messrs. Bô, Bourgois, Couvreux, Forot, Gueydan, Le Baron de Lassus St. Geniès, Georges Martin, Monvoisin, Rischmann, Terrier; Samper, representing the Colombian Government.

The board proceeded to the organization of the office. M. Bô is named president, Messrs. Monvoisin and Terrier, vice-presidents, and M. Georges Martin, secretary.

M. Bô, *President of the Board.*

CONSULATE-GENERAL OF THE UNITED STATES OF
AMERICA FOR THE REPUBLIC OF FRANCE,
At the City of Paris.

On the fourteenth day of January, A. D. 1902, before me, John K. Gowdy, consul-general of the United States of America, at Paris, France, residing therein, duly commissioned and qualified, personally appeared Marius Bô, president of the Compagnie Nouvelle de Panama, personally to me known, and known to me to be the individual described in and who executed the within instrument, and duly acknowledged to me that he executed the same freely and voluntarily for the uses and purposes therein mentioned, as and for the act and deed of the said company.

In testimony whereof I have hereunto set my hand and affixed the seal of the consulate-general of the United States of America at Paris aforesaid the day and year above written.

[SEAL.]

JOHN K. GOWDY,
United States Consul-General.

[Translation.]

Extract of the minutes of the annual general meeting of the shareholders of the New Panama Canal Company, held December 21, 1901, in the hall of the Société des Agriculteurs de France, No. 8 Rue d'Athènes, Paris.

SECOND RESOLUTION.

The general meeting, having heard the report of the board of directors, gives its approval to the conclusions of said report and gives full power to its board of directors to negotiate the transfer of the properties, concessions, privileges, etc., of the company and to deal, subject to the ratification of the shareholders.

This resolution is adopted by a nearly unanimous vote.

M. Bô,
President of the Board of Directors.

CONSULATE-GENERAL OF THE UNITED STATES
OF AMERICA FOR THE REPUBLIC OF FRANCE,
At the City of Paris.

On the 14th day of January, A. D. 1902, before me, John K. Gowdy, consul-general of the United States of America at Paris, France, residing therein, duly commissioned and qualified, personally appeared Marius Bô, president of the Compagnie Nouvelle de Panama, personally to me known, and known to me to be the individual described in and who executed the within instrument, and duly acknowledged to me that he executed the same freely and voluntarily for the uses and purposes therein mentioned, as and for the act and deed of the said company.

In testimony whereof I have hereunto set my hand and affixed the seal of the consulate-general of the United States of America at Paris aforesaid the day and year above written.

[SEAL.]

JOHN K. GOWDY,
United States Consul-General.

Mr. PASCO. Then the next paper is an extract from the minutes of the meeting of the board of directors held January 9, 1902, at which

of contents of the report of the Canal Commission, on page 6. The first contract between Colombia and the Interoceanic Canal Association was March 20, 1878. That was the Wyse concession. There was an additional contract with Mr. Wyse, representing the receiver of the old canal company, modifying that of May 20, 1878, made on December 10, 1890. Then there was a contract granting an extension to the Panama Canal Company in liquidation, April 4, 1893, and later a contract granting further extension of time to the New Panama Canal Company, April 25, 1900.

Senator MORGAN. We have all of those here except the last one.

Mr. PASCO. And that is in one of the appendices, and I have already furnished a copy of that this afternoon.

Senator MORGAN. That completes the list of concessions?

Mr. PASCO. Yes.

Senator MORGAN. If I understand it, that, with the laws of France, comprises the whole paper title?

Mr. PASCO. The whole paper title of the New Panama Canal Company.

Senator KITTREDGE. You stated the other day that you did not regard the concessions or franchises, whatever they may be termed, given to the New Panama Company by Colombia as valuable to this country.

Mr. PASCO. I do not.

Senator KITTREDGE. And the concessions given by the Colombian Government to the New Panama Canal Company are only important to determine what, if any, property the New Panama Canal Company has to convey to the United States. Is that right?

Mr. PASCO. If the concessions to the French company are out of the way, it will enable the United States and Colombia to negotiate with each other with reference to the arrangements and terms by which the territory of Colombia can be occupied by the United States for canal purposes.

Senator KITTREDGE. And these concessions are material to determine what, if anything, the New Panama Company has to give to the United States?

Mr. PASCO. Yes.

Senator KITTREDGE. Do you know anything about the Maritime Canal Company?

Mr. PASCO. Of Nicaragua?

Senator KITTREDGE. Yes.

Mr. PASCO. Oh, yes; we have investigated its affairs.

Senator KITTREDGE. Under what law was that company incorporated?

Mr. PASCO. It was incorporated under an act of Congress. I can give you the date of it in a moment.

Senator KITTREDGE. Under an act of the United States?

Mr. PASCO. Yes; it was approved February 20, 1889.

Senator KITTREDGE. And under that law it was necessary to report to the Secretary of the Interior?

Mr. PASCO. It was necessary for the company to report to the Secretary of the Interior, and it has done so each year since its organization.

Senator KITTREDGE. I call your attention to Senate Document No. 28, Fifty-sixth Congress, and especially to page 3, the statement of the Maritime Canal Company regarding its assets; and I particularly call your attention to that part relating to lands, enumerated as a part of its assets, and ask you to state what, if anything, you know regarding that feature of its property.

Mr. PASCO. Well, without being particular as to dates, the facts are all set forth in our report.

The Maritime Canal Company was working under a concession from the Republics of Nicaragua and Costa Rica. The Nicaragua Canal Construction Company, which was operating under it, had commenced to construct the proposed canal and failed, and from that time on the work was discontinued. The time elapsed for the construction of the canal under the terms of the concessions from Nicaragua and Costa Rica and the work was unfinished, and the Republic of Nicaragua declared the concessions were annulled and no longer in force.

Senator MORGAN. Was that by an act of Congress?

Mr. PASCO. I think it was a declaration of the President.

Senator MORGAN. It was by an act of Congress. The forfeiture was made by the Nicaraguan Congress.

Mr. PASCO. It was announced by the President.

Senator MORGAN. And then confirmed by an act of the Congress of Nicaragua.

Mr. PASCO. Yes; it was announced by the President of Nicaragua and confirmed by the Congress of Nicaragua. Then there was a contention between the company and the Government of Nicaragua as to the legality of the forfeiture, and my recollection is that the ground set up by the company was that the forfeiture should not have been declared until the company had had an opportunity to be heard. The company claimed that it was prevented from completing the work by acts over which it had no control, and that under such circumstances there should be an arbitration under the terms of the concession.

Senator KITTREDGE. What part, if any, did this Government take in that contention?

Mr. PASCO. The company has set forth among the reasons why it could not continue its work that the action of this Government in appointing the Nicaraguan Canal Board and afterwards the Nicaraguan Canal Commission and in the legislation of Congress made it impracticable for them to complete the canal, and that this Government was to some extent responsible for the failure to complete the work in the time required by its concession; and in its annual reports it is claimed that all the canal property still belongs to the company and that the forfeiture is null and void.

Senator KITTREDGE. Among their items enumerated as assets I see the item of lands. Do you know where those are situated?

Mr. PASCO. Those, I presume, are the land grants made by the Nicaraguan Government in their concession to this company, upon condition, of course, that they completed the canal. The company also purchased some lands there under one of the articles of the concession.

Senator KITTREDGE. In what manner was the title taken? Did you investigate that subject?

Mr. PASCO. Well, I have not a copy of the concession there, but I suppose the title was taken in the name of the company. It had the right to expropriate—as it is termed—the lands needed for its purposes.

Senator KITTREDGE. Did they have anything in lands in addition to the land actually needed for the construction of the canal?

Mr. PASCO. Well, I suppose the lands were all needed for canal purposes in one way and another.

Senator KITTREDGE. Do you know where they were located—whether on the east shore or west shore side of the Isthmus?

Mr. PASCO. They had lands all along the canal line. I do not know that I can state accurately whether the lands that were purchased were on the east side or the west side. Senator Morgan knows better than I do, but my general impression is that they are on the west side of the lake.

Senator KITTREDGE. Between the lake and Brito?

Mr. PASCO. Between the lake and Brito.

Senator MORGAN. I do not remember to have heard that they had ever expropriated or bought any land between Brito and the lake.

Mr. PASCO. My recollection was that they had purchased some outside of the lands that were granted to them.

Senator KITTREDGE. Have you investigated the subject whether all these lands you have last mentioned could be declared forfeited by the Government of Nicaragua?

Mr. PASCO. Well, the forfeiture was declared by the State of Nicaragua.

Senator KITTREDGE. Did that forfeiture extend to the lands you last mentioned?

Mr. PASCO. I understand that it extended to every item of property they had within the territory of the State of Nicaragua.

Senator MORGAN. They took up the iron on the railroad track and put it on a Government road.

Mr. PASCO. Yes; they took everything. It was an absolute forfeiture.

Senator MORGAN. I am trying to find, and perhaps you can show me, what you report on that subject as to the question whether the Maritime Canal Company of Nicaragua or Cragin & Co. have any rights down there that we are bound to respect. Could you refer me to that?

Mr. PASCO. You will find a reference to it on page 189. We say in our report:

“The time for the completion of the canal under this contract expired in February, 1901, and it has not been extended, and the contract of the Maritime Canal Company with Nicaragua having been declared forfeited by that Government, as already stated, there are now in force no obligations of either Republic with any government, corporation, or individual to prevent either of them from entering into an agreement with the United States that will authorize our Government to construct, control, and manage a maritime canal along this route and exercise all the privileges of ownership over it, provided the negotiations and action proceed upon the lines indicated by the treaty relations by which the different Governments are bound.”

Senator MITCHELL. I should like to ask you how recently and in what manner, if at all, the Maritime Canal Company has asserted any claim, and to what extent.

Mr. PASCO. Well, it asserts its claim every year regularly in the report to the Secretary of the Interior, and that report is published each year as a Senate document. I have not looked at it recently. I always get all these publications relating to the canal question. The report made in December last reiterates the claim that the forfeiture was illegal and void.

Senator KITTREDGE. Do you remember what, if anything, was written or done by this Government in support of the claim to rights made by the Maritime Canal Company?

Mr. PASCO. There have been various protests filed by the company with the Secretary of State, and my recollection is that some correspondence ensued between the two Governments, but it is all embraced in those reports, and I will not undertake to give the details. You will find another reference to the matter in our report on page 182. There we say:

“From these reports it appears that the surveys and plans for the canal were completed within the time required by the concession and duly approved by the Nicaraguan Government, and that the work of actual construction had been begun within this limit and officially recognized on the 8th day of October, 1889. The work proceeded under a contract with the Nicaragua Canal Construction Company, and some progress was made, but the construction company met with financial embarrassment, the work was stopped, and the company was obliged to suspend payment. This resulted in the appointment of a receiver for the company on the 30th day of August, 1893, by the circuit court of the United States for the southern district of New York, and the work of construction has not been since resumed.

“The President of Nicaragua, in a message to the Congress of the Republic dated on the 27th day of October, 1898, announced that the contract had become null and void, owing to the lack of fulfillment of its most essential clauses and the abandonment of the work; but an official declaration of forfeiture was delayed until after the time fixed for the completion of the work, the 8th day of October, 1899. Since then such declaration has been made, and by the terms of the contract a forfeiture authorizes Nicaragua to enter upon possession in perpetuity of all the property of the company within the territory of the Republic without being required to pay any indemnity.”

Senator MORGAN. That construction company mentioned there is not the Maritime Canal Company.

Mr. PASCO. No.

Senator MORGAN. That was a company that had a contract from the Maritime Canal Company to build the canal.

Mr. PASCO. Yes.

Senator MORGAN. For which these gentlemen who were here to-day did the work.

Mr. PASCO. Yes.

Senator MORGAN. Then, in your report you go on with a statement of the Cragin business. They had a contract subsequent to the time of the Maritime Canal Company contract.

Mr. PASCO. Yes; and their concession was declared forfeited.

Senator MORGAN. October 9, 1899.

Mr. PASCO. In reference to this subject, on page 184 we say:

“During the long period that the subject of establishing an inter-oceanic communication across the territory of Nicaragua has been before the commercial nations of the world that Republic has made other and earlier grants and concessions than those mentioned to individuals and companies proposing to undertake the work; but none of these projects thus authorized was ever actually commenced, and these contracts have long since expired. It has not, therefore, been deemed necessary to mention them specially in this connection, and this investigation has been limited to concessions under which the contracting persons or companies have commenced actual work and those in which it is claimed, or has within a recent period been claimed, that the conces-

sionaires have rights, privileges, or franchises still in force and entitled to recognition."

Senator MORGAN. On page 189 the Commission say:

"The time for the completion of the canal under this contract expired in February, 1901, and it has not been extended, and the contract of the Maritime Canal Company with Nicaragua having been declared forfeited by that Government, as already stated, there are now in force no obligations of either Republic with any government, corporation, or individual to prevent either of them from entering into an agreement with the United States that will authorize our Government to construct, control, and manage a maritime canal along this route and exercise all the privileges of ownership over it, provided the negotiations and actions proceed upon the lines indicated by the treaty relations by which the different governments are bound."

You mean there the treaty of 1867?

Mr. PASCO. Yes. That is one of them.

Senator MORGAN. And Nicaragua has given notice that she is going to terminate that?

Mr. PASCO. Yes; that is mentioned.

Senator MORGAN. This is the report of the Commission. That is your opinion that there were no incumbrances upon that?

Mr. PASCO. I do not think they have any valid claim. The Commission reached the conclusion that for the purposes of this report these declarations of the Nicaraguan Government should be regarded as settling the matter.

Senator MORGAN. The Maritime Canal Company of Nicaragua was chartered by an act of Congress of the United States?

Mr. PASCO. An act of Congress of the United States.

Senator MORGAN. That act of Congress organizing this company contained a provision that Congress may alter, amend, or repeal its charter.

Mr. PASCO. Yes.

Senator MORGAN. That puts it entirely within the power of Congress to dissolve the corporation by repealing its charter, and its concessions have been repealed or declared forfeited by Nicaragua?

Mr. PASCO. Yes. They still claim the title to the property though, and have done so since the report of the Commission was filed. You can not keep people from making claims, either in Panama or Nicaragua.

Senator MORGAN. Now, Mr. Pasco, we have before this committee all the title papers that relate to the transfer of this property, first from the liquidator to the new company and secondly from the new company to the United States, all that relates to it, and all the papers that relate to the concessions, and the records will be complete when those are supplied which you have referred to?

Mr. PASCO. Yes.

Senator MORGAN. Now, to what French laws do you refer us to ascertain the basis on which all these things rest?

Mr. PASCO. Well, I refer to the general incorporation laws of France.

Senator MORGAN. Where will you find them?

Mr. PASCO. In the volume which I see you have there—Goirand on the French Code of Commerce.

Senator MORGAN. Now this act or statute of the company, in accord-

ance with the statutes of France, is entitled "Compagnie Nouvelle du Canal de Panama, Société Anonyme, capital 65,000,000 de francs." So it is one of the societies or corporations or partnerships or joint stock companies that are called "sociétés anonymes?"

Mr. PASCO. Yes.

Senator MORGAN. That defines its character under the laws of France?

Mr. PASCO. Yes; that defines its character under the laws of France.

Senator MORGAN. You spoke about some proceedings having an analogy to bankruptcy proceedings in this matter. You do not mean to say that this was a bankruptcy proceeding?

Mr. PASCO. I say it was kindred to our bankruptcy proceedings.

Senator MORGAN. Kindred to ours?

Mr. PASCO. Yes; it dealt with an insolvent bankrupt corporation, and all of its affairs were taken in charge by the court.

Senator MORGAN. You do not understand that our bankruptcy laws control it in any way?

Mr. PASCO. Oh, no.

Senator MORGAN. Or that the bankruptcy laws of France control it in any way?

Mr. PASCO. I say it is kindred to the proceedings that we have in our country, in bankruptcy.

Senator MORGAN. Under the statute of France nobody can become a bankrupt who is not a trader, and this company being a "société anonyme," is not a trader. It is a company for the development of industry and work, but not for traffic. I call your attention to the citations on that subject on page 346 of Goirand's French Code of Commerce. I quote:

"It is, in the first place, indispensable that the debtor be a trader; that is to say, a person whose habitual occupation consists in the transaction of trading business. A minor, therefore, even if emancipated, but not authorized to carry on trade, or a married woman not duly authorized for this purpose by her husband or by a judicial decree, can not be declared bankrupt."

I call your attention, also, to a further quotation, on page 347 of the same work:

"Another condition necessary to obtain an adjudication of bankruptcy is that the debt giving rise thereto be a commercial one. This is a point of law firmly adhered to. In fact, the laws regulating bankruptcy have been enacted exclusively for the protection of commerce."

Citing the decree of the court of appeals of Paris of the 30th of August, 1871.

Mr. PASCO. I am not claiming this as a regular proceeding in bankruptcy. This is a proceeding under general and special statutes, and the power to dissolve is given clearly in this charter.

Senator MORGAN. Quite a distinct thing from a bankruptcy proceeding.

Mr. PASCO. I have not said it was a proceeding in bankruptcy under the laws of France. I said it was a kindred proceeding to our proceeding in the United States in bankruptcy.

Senator MORGAN. You are not defining it—you are simply describing it by an analogy.

Mr. PASCO. That is all.

Senator MORGAN. I will cite further, on page 348, so as to make it perfectly clear:

"The bankruptcy must be declared by a judgment emanating from the proper tribunal, i. e., the tribunal of commerce of the district in which the debtor is domiciled."

This was not the tribunal of commerce that the liquidation proceeding was before.

Mr. PASCO. I am not contending that it was.

Senator MORGAN. (Reading:)

"If the trader has establishments in several places, the tribunal of commerce competent is that of the place where his principal establishment is situated."

Then, again, on page 354:

"Bankruptcy creates a mortgage in favor of the general body of creditors on all the present and future real property to which the bankrupt is or may be entitled."

That is something that ought to be included in our statute.

Mr. PASCO. I will just refer at random to one or two articles in this general incorporation act:

"ART. 31. Meetings having to deliberate on amendments to the constitution and by-laws, or on motions to prolong the existence of the company beyond the time agreed on, or to dissolve said company before the date appointed for dissolution, are deemed to be regularly and duly held, and their decisions are considered valid only when the attendants at such meetings represent at least one-half of the capital stock."

And again:

"ART. 37. In case the company should have sustained the loss of three-fourths of its capital stock, the directors must call a general meeting of all the shareholders for the purpose of considering the advisability of dissolving the company."

"Whatever may be the decision taken by the company, it is announced by publication."

Showing that a company has a clear right to dissolve.

Then, again, in this charter under which the New Panama Canal Company was organized there is a title which relates to the subject of dissolution, Title IX.

"TITLE IX.—*Amendments to the by-laws—Liquidation.*

"ARTICLE 60.

"If experience should disclose the expediency of amending or amplifying the present by-laws, the general meeting shall provide therefor in the manner set forth in articles 61 and 62 hereinafter.

"It may decide notably in regard to—

"A reduction of the capital stock.

"A reduction of the duration, an extension, or an earlier dissolution of the corporation.

"Its fusion with other corporations.

"It may even effect all and any modifications bearing on the objects of the corporation without, however, altering their essentials."

Senator KITTREDGE. From what charter are you reading?

Mr. PASCO. The charter under which the new company was organized, the charter of 1894, Title IX, article 60.

Senator MORGAN. A modification in the character of the company must be assented to by every stockholder. What is that you are reading from?

Mr. PASCO. From the charter of the company. From the fact that it refers to "An earlier dissolution of the corporation," I understand that the power exists in the new company to dissolve it.

Senator MORGAN. Where the nature of a corporation anonyme is changed, it can only be done by the consent of every stockholder.

Mr. PASCO. It can be done in the way prescribed by the statutes.

Senator MORGAN. That is the way the statutes of France prescribe. Where the object of the corporation is changed, it can not be done except by the consent of every stockholder.

Now, on the subject of these actions by shareholders, I refer you to page 72 of Goirand on the French Code of Commerce, article 17, page 72:

"Action at law which it may be necessary to institute against the manager may be brought in the name of all the shareholders by the members of the committee of inspection. Moreover, shareholders representing one-twentieth part of the capital of the society may, in their common interest, depute at their expense one or more proxies to maintain, either as plaintiffs or defendants, an action against the manager or the members of the committee of inspection, and to represent them in such case before the courts, without prejudice to the action which each shareholder may bring individually in his own name."

I wish to cite page 88, sections 34, 36, and 37:

"ART. 34. Every societe anonyme must make out at the end of each half year a statement of its assets and liabilities. This statement is placed at the disposal of the auditors. In every year an inventory is further drawn up, containing the particulars of the real and personal property of the society and of all the debts due to and by the society. The inventory, the balance sheet, and the account of profit and loss are placed at the disposal of the auditors on the fortieth day at latest before the general meeting, and are submitted to such meeting.

"ART. 36. One-twentieth part, at least, of the net profits must be annually set aside in order to form a reserve fund. This deduction from the net profits ceases to be obligatory when the reserve fund shall have attained one-tenth of the capital of the societe.

"ART. 37. Lastly, in the event of the loss of three-fourths of the capital of the societe, the directors are bound to call a general meeting of all the shareholders with the object of deciding as to whether it may have become necessary to declare the dissolution of the societe. The decision of the meeting must in any case be made public. In the event of default on the part of the directors to convene a general meeting, as in the case in which such meeting may not have possessed the elements necessary for its legal constitution, any interested party may demand of the tribunals the dissolution of the societe."

Mr. PASCO. What is the heading of that particular statute?

Senator MORGAN. It is headed "Various precautionary measures imposed upon societes anonymes." The particular part I read was from the general corporation law relating to anonymous companies. I wish to read now from page 94:

"SEC. 2. Of liquidations and winding up of partnerships and companies.

"When a societe is dissolved, it becomes necessary to realize the assets and discharge the liabilities, in order to ascertain the surplus, which must then be divided between the members, or the total liabili-

ties to be definitely discharged by them; such is the object of a liquidation.

“The liquidation may be carried out by all the members or by the managers of the societe, or a liquidator foreign to the undertaking may be appointed.

“The liquidator must, in the first place, draw up an inventory and balance sheet in order to proceed to the realization of the assets and the payment of the creditors of the societe.

“They are responsible during a period of thirty years for their acts of management.

“Sometimes the liquidation is effected a forfait by a partner who on certain conditions engages his sole responsibility toward his copartners for the debt of the partnership, and who may consequently be sued for the whole, even in the event of his having been previously a simple commanditaire (court of cassation, July, 1870); but such an arrangement can not deprive the creditors of the partnership of their personal recourse against the other partners.”

Mr. PASCO. Is it your point that all these proceedings are void?

Senator MORGAN. No, sir; I do not make any point about it except that I think it is necessary, in order to show title, that this company should produce a record that will show its conformity to the laws of France.

Senator KITTREDGE. In what respect must they show conformity?

Senator MORGAN. One of my propositions is that a liquidation is a winding up under the laws of France and that there is no power under the French laws for any court to confer new powers upon a liquidator; that the court has no power to reinstate or revive or resurrect a corporation in a new form and start it to work again—that the judge has no such jurisdiction. That is one point I make.

Mr. PASCO. This company, though, as a matter of fact, has been organized and has been operating all these years, and its operations are recognized as regular by the courts of France and by the Colombian Government, where the property lies, and the question as to the ownership of that property of course must be settled at last by Colombia.

Senator MORGAN. That is a question between you and me as lawyers, or at least between you and the Senate. If they agree with you, of course, I am overruled. If they do not, I do not think I am overruled.

Mr. PASCO. I am only here to give the result of the investigations I have been making for the last two years and a half.

Senator MORGAN. I have not heard anywhere that lapse of time conferred jurisdiction on a court.

Senator KITTREDGE. You refer to which company?

Senator MORGAN. Both of them. I will not read any further authorities. This book is here and we all rely upon it, on both sides.

Now, Mr. Pasco, the other day I drew your attention to a statement in the report here on page 83. I do not know whether I read it to you or not. I know I read it when Mr. Noble was on the stand.

Mr. PASCO. Page 83?

Senator MORGAN. Yes [reading]:

“The liquidator found himself laboring under special legal difficulties, from which he obtained relief by the special law of the French Chambers, dated July 1, 1893. (See Appendix K K.) He finally secured the organization of a new company on the 20th of October,

1894, with a capital stock of 650,000 shares of 100 francs each. Six hundred thousand shares had been subscribed to be paid for in cash and 50,000 shares were given as full-paid stock to the Colombian Government in compliance with the terms of the extension of the concession, dated December 26, 1890. Thus the cash capital of the company was 60,000,000 francs, or \$11,640,000, a sum deemed sufficient for the provisional operations contemplated.

“The scandals connected with the failure of the old company, which had led to the prosecution and conviction of De Lesseps and other prominent persons, had made it difficult to secure even that amount. Suits had been brought against certain loan associations, administrators, contractors, and others who were supposed to have unduly profited by the extravagant management of the old company. A series of compromises were made with these persons, by which it was agreed that they should subscribe for stock in the new company on condition that the suits should be dropped. Whatever amount remained to make up the 60,000,000 francs, after deducting the sums thus obtained and those to be obtained by public subscription, was to be subscribed by the liquidator. The stock was subscribed as follows, viz:

	Francs.
Eiffel.....	10, 000, 000
Credit Lyonnais.....	4, 000, 000
Société Générale.....	4, 000, 000
Credit Industriel et Commercial.....	2, 000, 000
Administrators of the old company.....	7, 885, 000
Artigue, Sonderegger & Co.....	2, 200, 000
Baratoux, Letellier & Co.....	2, 200, 000
Jacob heirs.....	750, 000
Couvreux, Hersent & Co.....	500, 000
Various persons to the number of sixty, who had profited by syndicates created by the old company.....	3, 285, 700
Hugo Oberndorffer.....	3, 800, 000
Public subscription.....	3, 484, 300
The liquidator.....	15, 895, 000
Total.....	60, 000, 000

“See fourth report of the liquidator to the court, dated November 26, 1895, pages 8, 9, and 13.”

Is that report among the appendixes?

Mr. PASCO. No; it is not.

Senator MORGAN. Have you a copy of it?

Mr. PASCO. There was a copy in the possession of General Ernst, I think. He will be before you next week.

Senator MORGAN. Is it in French or English?

Mr. PASCO. I think it is in French. He and I had it there. We had all these reports and examined them.

Senator MORGAN. You of course had information upon this very important and rather peculiar situation, as to the men who were being pursued, I suppose, in the legal proceedings of course, probably civilly and probably criminally, for the purpose of compelling them to disgorge money that they had obtained from this company and had misused and squandered. You had the names of those people?

Mr. PASCO. That is the only list I know of.

Senator MORGAN. Are all of these mentioned here men of this character?

Mr. PASCO. I do not know the history of every subscription. There were compromises, and I do not know the history of all those com-

promises. I only know the fact that those suits and compromises were made, and contributions were made to the stock of the company.

Senator MORGAN. Now, you saw enough in the proof before you, the evidence before you, to authorize you to make this very strong statement about them.

Mr. PASCO. This was prepared by General Ernst, and it is a part of the chapter on the Panama route.

Senator MORGAN. And the Commission authorized it?

Mr. PASCO. Oh, yes; it is stated as a part of the report of the Commission.

Senator MORGAN. It is a finding of fact by the Commission?

Mr. PASCO. Yes; this is the best information that the Commission had upon the subject.

Senator MORGAN. Who were these administrators of the old company who subscribed 7,885,000 francs?

Mr. PASCO. I can not tell you who they are.

Senator MORGAN. I do not mean the individuals. What office was it that they held? You call them the "administrators" of the old company. What is an administrator?

Mr. PASCO. I can not give you any information with reference to the stockholders other than there is there.

Senator MORGAN. Do you know what that means: "Administrators of the old company?"

Mr. PASCO. No; I do not know what it means.

Senator MORGAN. Did you find anywhere in the statutes or charter of the old company such an office as "administrator?"

Mr. PASCO. No; I have not thought it necessary to examine.

Senator MORGAN. You have not examined into that?

Mr. PASCO. No, sir.

Senator MORGAN. "Various persons to the number of sixty who had profited by syndicates created by the old company." I wish you would explain that. How had they profited by the syndicates created by the old company?

Mr. PASCO. I suppose that is a part of the matter referred to on the previous page. It is an interesting fact in the history of these subscriptions, but it does not affect the fact that they had subscribed.

Senator MORGAN. Public subscription, 3,484,000 francs. I suppose that was by the general public?

Mr. PASCO. The general public put their money in.

Senator MORGAN. And then the liquidator comes in with 15,895,000 francs.

Mr. PASCO. Yes.

Senator MORGAN. Have you ever seen a law or can you cite a law, of France that authorizes a liquidator of a company that has gone into liquidation to subscribe to the stock of the new company?

Mr. PASCO. I read the authority for that in the order of the court.

Senator MORGAN. In the order of the court?

Mr. PASCO. In the law and in the order of the court

Senator MORGAN. What law?

Mr. PASCO. Here is the order of the court.

Senator MORGAN. We have had that. I want to know the law.

Mr. PASCO. Here is the order:

"Appoints Mr. Joseph Brunet receiver of said company, with the broadest powers, especially to grant or contribute to any new com-

pany all or a part of the corporate assets, to enter into or ratify with the contractors for the Panama Canal all agreements having for their purpose the continuance of the works, and to this end to contract all loans and form all sinking funds."

Senator MORGAN. In what law do you find that authority of the court?

Mr. PASCO. In article 10 of this act of 1893 reference is made to it.

"ART. 10. All acts tending to alienate any assets of the company or contracts entailing a transfer of the contribution of the whole or of a part of the assets of the concern emanating from the receiver of the Universal Company of the Panama Interoceanic Canal shall be subject to the approval or ratification of the Civil Tribunal of the Seine, who shall, on the report of one of the justices, pass on the question in open court."

Senator MORGAN. That is all the authority you have for it?

Mr. PASCO. The law and the charter; that is all.

Senator MORGAN. These are acts of alienation?

Mr. PASCO. Yes.

Senator MORGAN. But you find there nothing authorizing a contract of this kind?

Mr. PASCO. "A transfer or contribution of the whole or of a part of the assets of the concern."

Senator MORGAN. You derive your authority from that source?

Mr. PASCO. From the law and the charter.

Senator MORGAN. You have now stated the whole breadth of the law on which you rest?

Mr. PASCO. Yes; I think it is expressly stated in both. There is a contribution of that 15,895,000 francs, part of the old company's assets.

Senator MORGAN. Have you ascertained anything about this lottery law passed by the French Assembly? I asked you about that—called your attention to it the other day.

Mr. PASCO. Both the acts relating to the lotteries are in appendixes, but I have additional copies of them, and they are here. We had already furnished them in our report.

Senator MORGAN. Will you please be kind enough to read that statute?

Mr. PASCO. The first one is as follows:

[Translation.]

PARIS, June 8, 1888.

Law authorizing the Compagnie du Canal Interoceanique de Panama to issue in France securities repayable with prizes.

The Senate and the Chamber of Deputies have adopted:

The President of the Republic promulgates the law of the following tenor:

ART. 1. The Compagnie Universelle du Canal Interoceanique de Panama is authorized to create, up to six hundred million francs (600,000,000 fr.), an issue of securities, payable with prizes, by lot, upon the following conditions:

First. The securities issued shall bear annual interest, the rate of which can not be less than 3 per cent on their par value.

Second. The total annual sum distributed in the form of prizes can not in any case exceed 1 per cent of the par value.

Third. The par value of the securities issued can not be less than 300 fr. Subsequent division of the securities issued is forbidden.

Fourth. The payment of this loan in a period of 99 years, at farthest, shall be secured by a sufficient deposit, for this especial purpose, of French Government bonds, or of securities guaranteed by the French Government. The Compagnie Universelle du Canal Interoceanique de Panama, to meet the obligation imposed upon it, is authorized to increase, under the same conditions, the said loan of 600 millions by the sum necessary for the formation of this guaranty fund, this increase of loan not to exceed twenty per cent (20) of the par of the issue.

ART. 2. If the Compagnie Universelle du Canal Interoceanique de Panama should hereafter convert all or any of its former obligations, the provisions of article 1 shall be applicable to the new securities created by means of this conversion.

ART. 3. All material necessary for the completion of the works shall be manufactured in France.

The raw material must be of French origin.

ART. 4. All prospectuses, posters, publications, and other documents intended for advertising must bear, in type of the same size as that used for announcing the loan, and below the amount of the loan the notice: "Loan authorized in conformity with the provisions of the law of May 21st, 1836, by the law of June 8th, 1888, but without any guaranty or responsibility of the State."

The same notice shall be put at the top of the temporary or permanent certificates issued to subscribers.

Any violation of the above provision will entail the withdrawal of authorization by simple order of the minister of finance.

The present law, considered and adopted by the Senate and by the Chamber of Deputies, shall be executed as a law of the State.

CARNOT.

Done at Paris, June 8th, 1888.

By the President of the Republic.

P. PEYTRAL,

The Minister of Finance.

Senator MORGAN. How far was that law executed? To what extent? How many of the whole number of bonds were issued?

Mr. PASCO. There were about 850,000 of the 2,000,000 that were authorized. Some of them were not issued.

Senator MORGAN. Francs or dollars?

Mr. PASCO. Bonds.

Senator MORGAN. Eight hundred and fifty thousand of the 2,000,000 bonds.

Mr. PASCO. Yes.

Senator MORGAN. What was the aggregate?

Mr. PASCO. There were 720,000,000 francs altogether. The amount of 120,000,000 francs was reserved for the purpose of paying these obligations. The amount was invested in Government securities, and the payment of the entire debt was to be made in a period of ninety-nine years.

Senator MORGAN. That debt has not been paid?

Mr. PASCO. The debt has not been paid.

Senator MORGAN. Now, about the Panama Bond and Redemption Company. Have you got the statutes that refer to that?

Mr. PASCO. I have not. We did have a copy of the charter, but I have not been able to find it. It is a company formed under the general incorporation act, and it was charged with the duty of taking care of these bonds—of this issue mentioned in the fourth section.

Senator MORGAN. Of the lottery act?

Mr. PASCO. The fourth part of the first section.

Senator MORGAN. Of the lottery act?

Mr. PASCO. Of the lottery act.

Senator MORGAN. That comes in an auxiliary to this report?

Mr. PASCO. Yes.

Senator MORGAN. And it was for the purpose of handling the reserve bonds that were set apart as redemption bonds?

Mr. PASCO. Yes; and to pay them off as they could. This lottery, as I understand, was for the purpose of indicating which bonds were to be paid off as funds accumulated for that purpose, and my information is that the canal company was responsible for the interest, and that by the terms of the bonds they were to be paid out of this reserve fund. I have been trying to get a copy of one of the bonds, but I have not been able to do it. Now, some of the bonds were left over. About \$50,000 of the 2,000,000 were sold, and there was another law passed July 15, 1889, which is as follows:

[Translation.]

Law of July 15th, 1889.

ARTICLE 1.

The receiver of the Universal Company of the Interoceanic Canal of Panama is authorized to negotiate at any price and without interest such of the lottery bonds authorized by the law of June 8th, 1888, as had not been placed or sold up to the 4th day of February, 1889, when the said company was dissolved and was turned over into the hands of a receiver.

The sums resulting from the negotiation or sale of the said bonds shall be free from attachment or execution up to the amount of thirty-four million francs.

In case the receiver should contribute or give to a company formed for the purpose of completing the canal all or a part of the assets of the receivership, the new company shall only have power to emit and issue bonds as yet unplaced or unsold by complying with the terms of the law of June 8th, 1888, touching the minimum price of sale and the distribution of interest.

ARTICLE 2.

As the sale shall proceed, of those bonds on which full payment has not been made of the sum required to constitute the guarantee fund or capital prescribed and provided for by the first article of the law of June 8th, 1888, the receiver must turn over the complement of this sum to the civil, i. e., non-trading company created with a view to the formation of the said fund or capital.

The deposits made by the civil or non-trading company, by virtue of the law of June 8th, 1888, and also of the present law, shall not be withdrawn, but shall preserve their special character and shall remain

especially pledged until complete discharge of the lot guarantee and of the capital reimbursement.

The existence of this company, organized to redeem the bonds, is recognized in article 2.

Senator MORGAN. Now the basis of this whole business is French bonds, issued by the Government.

Mr. PASCO. Issued by the company.

Senator MORGAN. Issued by the company, but guaranteed by the Government.

Mr. PASCO. They are not guaranteed by the Government. There is no guaranty of the Government. You will not find that anywhere. Article 4 specially provided:

"All prospectuses, posters, publications, and other documents intended for advertising must bear, in type of the same size as that used for announcing the loan, and below the amount of the loan, the notice:

"Loan authorized in conformity with the provisions of the law of May 21st, 1836, by the law of June 8th, 1888, but without any guaranty or responsibility of the State."

Senator MORGAN. What does it say about the bonds of France there—French bonds?

Mr. PASCO. Article 1 says:

"The Compagnie Universelle du Canal Interoceanique de Panama is authorized to create, up to 600,000,000 francs, an issue of securities, payable with prizes by lot, upon the following conditions."

Senator MORGAN. What is meant by the expression in article 4—

"The payment of this loan in a period of ninety-nine years at furthest shall be secured by a sufficient deposit for this especial purpose of French Government bonds or of securities guaranteed by the French Government."

Mr. PASCO. It means that this surplus fund must be invested in French Government bonds, which constitute the reserve fund for the ultimate redemption of these obligations. It says:

"The Compagnie Universelle du Canal Interoceanique de Panama, to meet the obligation imposed upon it, is authorized to increase, under the same conditions, the said loan of 600,000,000 by the sum necessary for the formation of this guaranty fund, this increase of loan not to exceed 20 per cent of the par of the issue."

That is, they are to raise the guaranty fund by the issue of the 120,000,000 francs worth of bonds.

Senator MORGAN. They had the right to sell these lottery bonds to the people of France or anybody, get the money from them, invest it in safe securities, leave them on deposit with a French Government officer, to stand for the redemption of the bond.

Mr. PASCO. Not with a government officer, but with this civil and nontrading company which was organized to carry out that part of it.

Senator MORGAN. And then the lottery was to be drawn to see who should receive the first payment of the fund.

Mr. PASCO. As the fund accumulated.

Senator MORGAN. What interest did those bonds bear?

Mr. PASCO. The first issue bore 3 per cent.

Senator MORGAN. That brings to my attention the fact that a gentleman wrote to the Senator from California, Mr. Perkins, that he had some of those bonds, referring to these 3 per cent lottery bonds.

Mr. PASCO. The second lot were issued without interest.

Senator HARRIS. I do not think I have anything else to ask you.

Senator KITTREDGE. Are you familiar with the transportation now being conducted up the San Juan River, from Greytown to the lake?

Mr. PASCO. It is carried on by a company which was auxiliary to the Atlas Company, but I can not tell what arrangement had been made by the recent transfer of the Atlas line to a German company. I presume it is still going on in the same manner.

Senator KITTREDGE. Do you know about the concessions, if any, that that company has?

Mr. PASCO. They are referred to in our report.

Senator MORGAN. You state that they are not in existence now, do you not?

Mr. PASCO. Oh, the concession is in existence, but there is a provision in it that it shall not interfere with any existing concessions, or any future concessions that may be made for the purpose of establishing a canal.

Senator MORGAN. There is an express reservation.

Senator KITTREDGE. What I want to get at is whether there is any new light upon that subject since your report was written?

Mr. PASCO. No; there is nothing since this report. May I recapitulate one or two points, to show what I regard as the essential points in the transfer of this property?

Senator KITTREDGE. Certainly.

Mr. PASCO. I do this so that my position may be clearly understood.

Here is the New Panama Canal Company which holds the title to this property. It is unable to complete its work, and it proposes a sale to the United States. The only other party interested in this property is the receiver of the old company, who is acting under the orders of the courts having jurisdiction of the subject-matter.

The new company, through its proper officers and the liquidator together, can make a valid title to the property. The liquidator, however, can not act without the authority of the court. He presents the whole subject to the proper tribunal and is authorized to enter into negotiations to fix a price and arrange for a division of the purchase money with the canal company.

The price is subsequently fixed; his action is to be ratified, and then the title will pass in accordance with the final judgment of the court ratifying it, after proper time has been given for appeal.

Now, when that is done, the purchase money is passed over to the vendors, the receiver, and the representatives of the canal company, and it is determined, with the approval of the court, what is the proper amount of the purchase money that belongs to each interest. The amount to which the receiver is entitled under this judgment of the court is determined in the manner indicated and carried out by the parties, and the share of the receiver is separated and it is subject to the control of the court. The court then disposes of it. It matters not how many creditors there are, so far as the United States is concerned.

The property is sold and the proceeds are substituted in its place; all the different claims that may be set up by the bondholders, or other stockholders, creditors, or claimants are settled finally by the courts, and they must look to the fund and not to the property for final satisfaction. That is, in brief, the general view I have taken of the matter.

Senator MORGAN. I should like to ask you a question or two about that. Have you considered the question as to whether or not the new company is dissolved when it makes the sale, under the French law?

Mr. PASCO. It must dissolve, of course.

Senator MORGAN. It is dissolved by that act, is it?

Mr. PASCO. It will be dissolved in the proceeding.

Senator MORGAN. But that is the act upon which a dissolution would take place.

Mr. PASCO. The subject-matter would be disposed of.

Senator MORGAN. And all the property would revert, under these statutes, to the receiver or liquidator?

Mr. PASCO. The property would go to the purchaser.

Senator MORGAN. When this company makes the sale, so far as it is concerned, the property or its proceeds would go to the liquidator?

Mr. PASCO. No; the proceeds would be divided.

Senator MORGAN. Between whom?

Mr. PASCO. Between the liquidator and the new company.

Senator MORGAN. Is that your judgment upon these acts of the company?

Mr. PASCO. There is a special provision made as to the terms of the division in one of these papers which have been filed.

Senator MORGAN. A contract, you mean?

Mr. PASCO. Yes.

Senator MORGAN. I am speaking about the law.

Mr. PASCO. The court will execute the law. The court will determine whether that is a fair division, and will ratify it or reject it.

Senator MORGAN. This company has done nothing to forfeit its right as a company, its corporate existence, has it?

Mr. PASCO. Not up to the present time.

Senator MORGAN. But it will when it makes the sale?

Mr. PASCO. I think it will, of course, go out of existence then.

Senator MORGAN. Go out of existence?

Mr. PASCO. Yes.

Senator MORGAN. When it goes out of existence, its successor would be the liquidator of the old company?

Mr. PASCO. No; there would be no successor.

Senator MORGAN. No successor?

Mr. PASCO. The funds of the company will be distributed among the stockholders, and there will be no successor. The partition must take place when this sale occurs, a partition of the funds; and whether it is 50, 60, or some other per cent, the proper share belonging to the liquidator will be turned over to the liquidator.

Senator MORGAN. You are back on the agreement again. I am speaking about the French law.

Mr. PASCO. I say this will be the French law when the court authorizes it.

Senator MORGAN. This is a new company, in full tide of operation, with at least \$3,000,000 in its treasury in money, owing no debts, and with every prospect that it has ever had of completing that canal except the possible competition of the United States in building another canal.

Mr. PASCO. Yes.

Senator MORGAN. That is the situation exactly, is it not?

Mr. PASCO. I do not admit that there is every prospect of their com-

pleting the canal. I think they are unable to complete it, and that is a reason they are seeking a purchaser.

Senator MORGAN. You think they are unable to complete it?

Mr. PASCO. I think they are unable to complete it, and that is a reason why they are seeking a purchaser.

Senator MORGAN. The French people are not unable to complete it, are they?

Mr. PASCO. I suppose they are unwilling, if they are not unable. They have been unsuccessful in raising funds.

Senator MORGAN. I take your side on that.

Mr. PASCO. Now, in addition to what I have said, there can be no valid sale, unless it is done with the consent of Colombia. I mean the sale to the United States. The concession forbids a sale to a foreign government, and this sale must be permitted by the Colombian Government and the United States must enter into treaty negotiations to settle the terms upon which Colombia will permit the sale to be made. And when a sale is made in accordance with that authority, and Colombia recognizes the transaction as a legal one, the property will pass to the United States.

Senator MORGAN. Why not purchase from Colombia and let her settle these outstanding obligations?

Mr. PASCO. Well, that might be a better way. We may have to do that with reference to Nicaragua.

Senator MORGAN. That is exactly what we are doing with Nicaragua, if we buy.

Mr. PASCO. In my judgment, if we were making a treaty with Nicaragua we ought to require Nicaragua to give us a warranty deed and leave it to Nicaragua to settle with the claimants there, if they still maintain the claims they set up in their last report.

Senator MORGAN. There are no warranty deeds between governments.

Mr. PASCO. Not technically so. The way to do it would be this: A treaty obligation would be entered into to settle claims that might be set up by other parties claiming to be concessionaires, and that would accomplish the same purposes as a warranty deed.

Senator MORGAN. That same thing ought to apply to Colombia, that she would undertake to protect us against all claims of those bondholders and stockholders of the French company.

Mr. PASCO. Well, if it was considered necessary by our Government to be done.

Senator MORGAN. Then you think it is worth while to pay \$40,000,000 for the opportunity of making that contract with Colombia?

Mr. PASCO. We have reported in favor of it, after considering the whole matter.

Senator MORGAN. You have reported both ways.

Mr. PASCO. We have not. Excuse me for contradicting you. We reported against paying \$109,000,000. We did not report against paying \$40,000,000.

Senator MORGAN. I was foolish enough to follow the Commission through a great many reports, and I have my opinions so fixed that it seems to be troublesome to get rid of them.

Mr. PASCO. Our proposition in the report of the Commission was that we would not advise the payment of \$109,000,000. We have

never said that we would not advise the payment of \$40,000,000. We recommend in favor of it. That is a very different proposition.

Senator MORGAN. There is quite a difference between the proposition to pay forty millions for work you price at \$21,000,000, too, isn't there?

Mr. PASCO. We price it at \$40,000,000. Our engineers report it is worth \$40,000,000.

Senator MORGAN. When you come to itemize the account, you put down the work that is remaining there at \$21,000,000.

Mr. PASCO. I think you will find our estimate is \$40,000,000. I can refer to the page.

Senator MORGAN. Yes; I know what the estimate is. Then you add first 20 per cent on that and then 10 per cent on top of that, in order to work it up to \$40,000,000.

Mr. PASCO. You must remember that work has been going on there for a year or two since the estimate was made, and that percentage was put on by the engineers in part to cover the work that was progressing after the time that our estimates were made.

Senator MORGAN. Unfortunately the report does not say that, and you made the report last November. I suppose there has not been much progress made since that time.

Mr. PASCO. I can not give you the date, but I can put it in the testimony. The work has been going on from the time that the estimate was made, for certainly a year, and it may continue a year longer.

Senator MORGAN. I thought the estimate was made when the report was made.

Mr. PASCO. No, sir; it was first made prior to the preliminary report of November 30, 1900, certainly.

Senator MORGAN. There is no date given.

Mr. PASCO. I am not sure whether there is or not.

Senator MORGAN. Well, that is all I want to ask you. I will ask you to produce those papers and let the record show your testimony complete without anything omitted, if you can, and we will try and have these appendices printed Monday.

The subcommittee then (at 5.15 o'clock p. m.) took a recess until Monday, February 17, 1902, at 10.30 o'clock a. m.

STATEMENT
OF
CHARLES COLNÉ
BEFORE
THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,
UNITED STATES SENATE,
CONSISTING OF
SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Monday, February 17, 1902.*

The subcommittee met at 10.30 a. m.

Present, Senators Morgan (chairman), Hanna, and Foster, of Louisiana. Also Senators Kittredge, Hawley, and Harris, members of the committee.

Mr. CHARLES COLNÉ appeared, and was duly sworn by the chairman.

STATEMENT OF MR. CHARLES COLNÉ.

The CHAIRMAN. What is your full name?

Mr. COLNÉ. Charles Colné.

The CHAIRMAN. You are a Frenchman?

Mr. COLNÉ. Yes.

The CHAIRMAN. How long have you been an American citizen?

Mr. COLNÉ. About fifty years.

The CHAIRMAN. You must have come here as a boy, then?

Mr. COLNÉ. I did.

The CHAIRMAN. What relation, if any, did you hold in the old Panama Canal Company?

Mr. COLNÉ. I was the general agent and secretary of the American committee.

The CHAIRMAN. Who comprised the American committee?

Mr. COLNÉ. Messrs. J. & W. Seligman & Co., Messrs. Winslow, Lanier & Co., and Messrs. Drexel, Morgan & Co., at that time.

The CHAIRMAN. They comprised the American committee?

Mr. COLNÉ. Yes.

The CHAIRMAN. What was the object of organizing that committee? What was the purpose of the organization of the American committee, as you call it?

Mr. COLNÉ. It was intended to have representatives here to put the Panama Canal before the American people in its proper light, and to show what was intended to be done. They were to take care of the business in general connected with the affairs of the American branch.

The CHAIRMAN. By whom was it organized, by whose orders?

Mr. COLNÉ. By the company in Paris.

The CHAIRMAN. Was that done at the instance of Mr. de Lesseps?

Mr. COLNÉ. Yes.

The CHAIRMAN. Did you know Mr. de Lesseps personally?

Mr. COLNÉ. I knew him very well.

Senator HAWLEY. He was before the Committee on Appropriations of the House of Representatives when I was a member of that committee.

The CHAIRMAN. Was that appointment of the American committee at the instance of Mr. de Lesseps?

Mr. COLNÉ. Yes.

The CHAIRMAN. About how much money was intrusted to that committee for expenditure?

Mr. COLNÉ. It is hard for me to give you the figures now, because I would have to refresh my memory as to how much was the annual appropriation for that. I can send that to you.

The CHAIRMAN. Did you use the expression "annual appropriation?"

Mr. COLNÉ. Yes; they made an annual appropriation for their services.

(A) This was an amount provided for in a lump, not an annual appropriation.

Senator HAWLEY. By whom was the appropriation made? You do not mean that Congress made an appropriation?

Mr. COLNÉ. No; the company in Paris.

The CHAIRMAN. About what was the aggregate of the sum that was sent to America to be expended?

Mr. COLNÉ. Well, it was over \$1,000,000, but I have not the exact figures.

The CHAIRMAN. I see Mr. Fellows, in his report, states it at a million and a half. Did you appear before the committee of which Mr. Fellows was chairman?

Mr. COLNÉ. I did.

The CHAIRMAN. And you gave the information upon which they made their report?

Mr. COLNÉ. I did not give that special information. That was not a part of it.

The CHAIRMAN. But you are satisfied it was in excess of \$1,000,000?

Mr. COLNÉ. I am satisfied those figures are very nearly correct.

The CHAIRMAN. That would be a million and a half?

Mr. COLNÉ. Yes.

(B) The exact amount was 12,000,000 francs, or about \$2,400,000, as stated in Monchecourt's report to the judges of the civil tribunal of the Seine in 1890, viz:

Expenses previous to the organization of the company:	Francs.
Part of allowance to the American committee	3, 100, 000
Balance of allowance to the American committee	8, 900, 000
	<hr/>
	12, 000, 000

The CHAIRMAN. What use was made of that money?

Mr. COLNÉ. Well, now, there is a little difficulty about this; that I was not connected with the disbursement of that fund at all, so that I am not familiar as to what they did with it, although I was the secretary. That fund was put in the hands of the bankers for them to dispose of it, and I was more particularly charged with the rest of the business.

The CHAIRMAN. Did you have charge and direction of the purchases that were made in the United States for the Panama Canal?

Mr. COLNÉ. Yes; I did of that.

The CHAIRMAN. Was this money that you have spoken of applied to such purchases as you made?

Mr. COLNÉ. No, sir.

The CHAIRMAN. Applied to other purposes?

Mr. COLNÉ. Yes.

The CHAIRMAN. And you do not know exactly what they were?

Mr. COLNÉ. I do not know exactly how it was disposed of.

The CHAIRMAN. Was any stock subscribed in the United States?

Mr. COLNÉ. Yes; at each of the loans we had some subscribers. A subscription was opened in the office every time that the Paris house was making an issue. We did not get very many subscribers.

The CHAIRMAN. About how many should you judge?

Mr. COLNÉ. Well, I do not suppose the amount would not exceed \$200,000.

The CHAIRMAN. But you think about that amount was subscribed here in the United States?

Mr. COLNÉ. Yes; about that.

The CHAIRMAN. I will ask you whether a portion of that was or was not subscribed by the gentlemen who were made the committee of the Panama Canal Company in the United States?

Mr. COLNÉ. There were quite a number of subscribers, and it would be difficult to recollect now whether they subscribed. I know some of their friends did subscribe. Whether they did subscribe themselves—you are speaking of the American committee?

The CHAIRMAN. Yes.

Mr. COLNÉ. Whether they themselves subscribed for it—I think they did.

The CHAIRMAN. Do you know whether any portion of that money that came into the hands of the American committee was applied to the salary of the Hon. Richard W. Thompson, who was Secretary of the Navy, and who resigned to become the agent of the company?

Mr. COLNÉ. Yes.

The CHAIRMAN. How much annually was applied to him?

Mr. COLNÉ. It was about \$25,000. Later on it was reduced to \$12,500.

The CHAIRMAN. How much was the salary of the other members of the committee?

Mr. COLNÉ. They received no salary. There was a certain amount of money appropriated, which they distributed among themselves; in what way, I say I am not familiar with.

The CHAIRMAN. You do not know?

Mr. COLNÉ. No; I could not say.

Senator HAWLEY. Let us understand that. Was the money given to Mr. Thompson himself?

The CHAIRMAN. He received a salary of \$25,000 a year?

Mr. COLNÉ. Yes.

Senator HAWLEY. When he was Secretary of the Navy?

The CHAIRMAN. He only remained Secretary of the Navy a very few days after he accepted this situation, because Mr. Hayes invited him to resign.

Senator HAWLEY. That was quite right.

The CHAIRMAN. I could not state that fact on my own authority, but I can state it on the authority of a person who knows it. Now, Mr. Colné, are you familiar with the different classes of bonds that were issued by the old company?

Mr. COLNÉ. Yes; I have a record at home of all the loans that were issued.

The CHAIRMAN. What loans?

Mr. COLNÉ. All the loans that were issued up to the last one, of 1888, which was a failure in Paris.

The CHAIRMAN. You can furnish the committee with that record?

Mr. COLNÉ. I will.

The CHAIRMAN. Of all the loans?

Mr. COLNÉ. I will.

The CHAIRMAN. Will that record show the rate per cent of interest that they were to bear?

Mr. COLNÉ. Yes.

The CHAIRMAN. Do you know whether the shareholders in the old company were to receive any interest on their shares?

Mr. COLNÉ. They were to receive interest.

The CHAIRMAN. At what rate per cent?

Mr. COLNÉ. Four per cent, I think, if I remember right; but I can give you all that.

The CHAIRMAN. Please insert it in your testimony.

Mr. COLNÉ.

(C) *Capital and loans, 1881-1889.*

	Francs.	
600,000 shares of 500 francs	300,000,000. 00	
Less installments due.....	2,294,875. 00	
	<hr/>	297,705. 125. 00
250,000 bonds of 500 francs, 5 per cent	109,375,000. 00	
Less installments due and 25 bonds re-		
imbursed	111,802. 50	
	<hr/>	109,263,197. 50
600,000 bonds of 500 francs, 3 per cent.....	171,000,000. 00	
Less installments due and 20 bonds re-		
imbursed	2,748,135. 00	
	<hr/>	168,251,865. 00
459,762 bonds of 500 francs, 4 per cent.....	145,190,767. 80	
Less installments due.....	859,054. 00	
	<hr/>	144,331,713. 80
458,802 new bonds, 1,000 francs	206,460,900. 00	
Less installments due.....	488,470. 00	
	<hr/>	205,972,430. 00
258,887 new bonds, second series, 1,000 francs....	113,910,280. 00	
Less installments due.....	1,035,450. 00	
	<hr/>	112,874,830. 00
89,802 new bonds, third series, 1,000 francs.....	34,997,635. 44	
Less installments due.....	128,520. 24	
	<hr/>	34,869,115. 20
849,249 lottery bonds.....	254,603,871. 73	
Less installments due (judgment of		
July 26, 1889).....	68,732,694. 95	
	<hr/>	185,871,176. 78
357,699 lottery bonds (bons à lots)		12,543,184. 29
	<hr/>	
Total of capital and loans.....		1,271,682,637. 57

The CHAIRMAN. You were the agent of the company here at the time it failed?

Mr. COLNÉ. Yes.

The CHAIRMAN. At what date did you cease to be the agent?

Mr. COLNÉ. Some time in March, 1889.

The CHAIRMAN. Had you been making large purchases for the company?

Mr. COLNÉ. I bought over \$2,000,000 worth of American machinery and different things.

The CHAIRMAN. And sent it to the Isthmus?

Mr. COLNÉ. Yes.

The CHAIRMAN. Did you visit the Isthmus during the time that you were agent?

Mr. COLNÉ. Yes.

The CHAIRMAN. How long did you stay there?

Mr. COLNÉ. I stayed there about twelve days.

The CHAIRMAN. Do you recollect the year?

Mr. COLNÉ. 1883, I think.

The CHAIRMAN. As the work progressed, were you informed of the condition of the health of the laborers in Panama?

Mr. COLNÉ. Yes.

The CHAIRMAN. What was it?

Mr. COLNÉ. I became informed of that in connection with a large hospital that we built over on the Panama side, just a short distance outside of the city. I bought what was necessary for the hospital, and certain reports were sent over to the company in Paris. How reliable they were I do not know.

The CHAIRMAN. And were those reports communicated to you?

Mr. COLNÉ. Some of them: only occasionally.

Senator HAWLEY. Reports of the health?

Mr. COLNÉ. Yes.

The CHAIRMAN. What was the state of the health of the laborers, employees, and officers of the canal during the time you had cognizance of it?

Mr. COLNÉ. Well, the climate is pretty bad.

The CHAIRMAN. I am speaking about the effect it had upon the men. What was the state of their health?

Mr. COLNÉ. In the first place, there were a great many that were taken sick and died because of their manner of living. Many Frenchmen came over who used to take big dinners on the boulevards in Paris. They came over there and kept up that same manner of living, and the consequence was that quite a number died. Our American employees stood it a great deal better. They adapted themselves to the circumstances a little better than the other people did.

The CHAIRMAN. How about the laborers on the canal—the negroes and Chinamen and others?

Mr. COLNÉ. The negroes did well enough, sir. They were not sick very much. Those negroes from Jamaica that were employed there, quite a number of them, they did well enough; but the Chinese did not do so well, nor did the men who came from other sections.

The CHAIRMAN. Was the mortality great or small?

Mr. COLNÉ. It was pretty large.

The CHAIRMAN. Can you furnish any figures on that subject to the committee from memoranda that you have in your possession?

Mr. COLNÉ. No, sir; I could not now, but I will endeavor to do so.

(D) All I can find in my memoranda is:

In the report of the new company for 1897 I find—

The sanitary conditions were not satisfactory, owing to the breaking out of “berri-berri” and yellow fever. A proportion of 3.04 per cent of the workmen were treated. The deaths were 112.

The liquidator in his report of 1890 puts down expenses from 1881 to 1890:

	France.
Construction of Central Hospital	3, 415, 852. 13
Hospital at Colon.....	378, 399. 60
Constructions (houses) on the line.....	83, 155. 80
Emperador, houses.....	33, 272. 53
Sanitarium at Taboga.....	665, 606. 80
Cemetery at Panama	23, 184. 23
Expenses Central Hospital.....	2, 046, 014. 06
Expenses Colon Hospital	1, 203, 365. 01
Expenses Taboga Sanitarium.....	366, 415. 63
Expenses on the line	188, 845. 80
Expenses before establishing hospitals.....	99, 134. 66
Purchase of medicines	680, 411. 09
	<hr/>
	9, 183, 657. 34

Senator HAWLEY. Let me interject a question. How do the natives of that region stand the climate?

Mr. COLNÉ. They stand it much better, but they are entirely worthless as workmen.

The CHAIRMAN. You mean the people of Panama?

Mr. COLNÉ. Yes; they do not work.

The CHAIRMAN. While you were on the isthmus what was the condition of the health of the people there?

Mr. COLNÉ. There are two seasons there, the rainy season and the dry season. I went in the dry season, in January. At that time the health is better. For about four months the rain stops, and the health is much better. After that you have those tremendous outpourings of rain, and then it is very sickly.

The CHAIRMAN. I suppose you do not know anything about the engineering that was done on that route. You had no connection with that, had you?

Mr. COLNÉ. Of what nature?

The CHAIRMAN. I mean you had no knowledge of the difficulties of the construction of the canal?

Mr. COLNÉ. Oh, yes; I became acquainted with those things from correspondence and from engineers that came through. Yes; I was pretty well posted in regard to that, but I do not claim to be an engineer.

The CHAIRMAN. Were there any landslides in the heavy cuts on that canal?

Mr. COLNÉ. At the Culebra; yes.

The CHAIRMAN. About how many were you informed of?

Mr. COLNÉ. Well, of several of them, but I could not say exactly how many.

The CHAIRMAN. Do you know the extent to which they affected the canal work?

Mr. COLNÉ. Some of them did, to quite an extent, and covered the machinery, and came down in pretty large quantities.

Senator KITTREDGE. When were you there?

Mr. COLNÉ. I was there in 1883, I think.

Senator KITTREDGE. Have you been there since?

Mr. COLNÉ. No, sir.

The CHAIRMAN. You are speaking not from personal observation, but from information received from the company and its agents?

Mr. COLNÉ. Yes; from the agents and from some of the engineers;

not personally, but naturally, when they came through, I always asked them for information about how things were getting along.

The CHAIRMAN. You spoke a while ago of having purchased the hospital supplies for the company there.

Mr. COLNÉ. Yes, sir.

The CHAIRMAN. And I suppose it was in that way that you became informed of the state of the health?

Mr. COLNÉ. Yes.

The CHAIRMAN. Did the company keep you advised of the progress of the work, and its difficulties, as to health of employees, and as to landslides, or any other difficulties that it encountered?

Mr. COLNÉ. Not exactly from the company. I got them from engineers that passed through New York. I received no official notice of those things, except on the progress of the work.

The CHAIRMAN. Your office in New York was the headquarters of the company in America?

Mr. COLNÉ. Yes, sir.

The CHAIRMAN. Who took that company into court at its failure?

Mr. COLNÉ. You mean in Paris?

The CHAIRMAN. Yes.

Mr. COLNÉ. Why, Mr. Brunet was appointed the receiver.

The CHAIRMAN. I understand that, but who took the company into court? Who brought the suit?

Mr. COLNÉ. I have a pamphlet at home that will give me that information, but I do not remember at whose instance it was.

The CHAIRMAN. Is that pamphlet in French or English?

Mr. COLNÉ. In French. I have very little in English; nearly all in French.

The CHAIRMAN. Could you furnish the committee with the translation of so much of that pamphlet as would show who instituted that suit? We never have found out yet.

Mr. COLNÉ. I will. I can do that, sir. It was an absolute necessity to bring that suit about, owing to the corruption which had been disclosed.

The CHAIRMAN. I am not speaking of the necessity to bring it about. I want to know who the person was that instituted the proceedings, whether it was done by the Government, or by a stockholder, or by a bondholder, or by the president of the company, or whom.

Mr. COLNÉ. I do not know who brought the suit, but I know that Mr. Monchicourt, the man who was subsequently appointed the liquidator, defended it.

The CHAIRMAN. Defended it?

Mr. COLNÉ. Yes; that is, he appeared in court as defending the company, as he was the liquidator.

The CHAIRMAN. I suppose that all the information you have on this subject is derived from your connection as an officer of the company?

Mr. COLNÉ. Most of it; yes, nearly all that I am talking now.

(E) The company was taken into court by an association of holders of securities of the company entitled "Porteurs de titres de Panama," which was organized to protect the interests of the holders of Panama securities.

A parliamentary committee of inquiry was also appointed in 1892 to quire into the corruption which was then charged.

In 1893 a criminal action was brought before the court of assize by

a citizen as a civil party. The Panama scandal, as it was called, created much excitement and lasted a long while.

The pamphlet from which I draw the above information is entitled "Documents concernant le concessionnaire pendant les procès du Panama" (Documents concerning the concessionnaire published during the Panama trials), a pamphlet of 54 pages, by Lucien Bonaparte Wyse, a gentleman who is thoroughly conversant with the Panama affairs.

The CHAIRMAN. Were you informed by the company in regard to a number of proceedings, civil and criminal, against men who were alleged to have defrauded the old company?

Mr. COLNÉ. That was after I severed my connection with the company, Mr. Senator, so that I could not be informed. This came subsequent to my leaving the company.

The CHAIRMAN. Those proceedings were afterward?

Mr. COLNÉ. Yes.

The CHAIRMAN. Did you know of any controversy between the company and either of the men whose names I will read to you: Eiffel; do you know whether he had any controversy with the company about misappropriation of funds?

Mr. COLNÉ. The company had a claim against him.

The CHAIRMAN. Was it a large one or a small one?

Mr. COLNÉ. Very large.

The CHAIRMAN. Do you know what disposition was made of that claim?

Mr. COLNÉ. Well, it arose in this way, that this man Eiffel took a contract for building the locks, and was to furnish quite an amount of steel and iron, and build the locks out of steel. They advanced him a lot of money before he ever delivered one inch of that steel at all. In the meantime the company failed, and he had had in his hands a large amount of money and had only partially furnished what he had agreed to furnish. So the controversy was to make him refund that money.

The liquidator's report for 1890 shows that a compromise was reached and, on settlement of account, he refunded for advances made, etc., 3,000,000 francs.

Senator HAWLEY. Is he the Eiffel tower man?

Mr. COLNÉ. Yes; the same man.

The CHAIRMAN. He is a stockholder in the new company to the amount of 10,000,000 of francs?

Mr. COLNÉ. Yes.

The CHAIRMAN. Do you know anything about the circumstances under which he agreed to become a stockholder in the new company?

Mr. COLNÉ. Well, not of his own volition at all. He and a number of contractors that had taken large contracts for the Panama Company were forced—I may use that expression—were forced to subscribe to the new company.

The CHAIRMAN. Now, I will mention some names. What was the Crédit Lyonnais?

Mr. COLNÉ. The Crédit Lyonnais—that is a trust company.

Senator HAWLEY. A banking institution?

Mr. COLNÉ. Yes.

Senator HAWLEY. A big banking company?

Mr. COLNÉ. Yes.

The CHAIRMAN. Did they have a controversy also with the old Panama company?

Mr. COLNÉ. They were mixed into the subscriptions, and there was a syndicate of bankers besides those that were made to disgorge that took a certain amount of cash in the last subscription, because they themselves had had a very good share of the profits before.

The CHAIRMAN. I suppose those are the ones here mentioned, "Various persons to the number of sixty, who had profited by syndicate created for the old company, who subscribed 3,285,700 francs?"

Mr. COLNÉ. Yes.

The CHAIRMAN. I suppose that is the party you refer to?

Mr. COLNÉ. Yes; that is the party, and also various other parties who had received undue share of profit.

The CHAIRMAN. Here is the Société Générale. What was that?

Mr. COLNÉ. The Société Générale; they are contractors.

The CHAIRMAN. They were not bankers?

Mr. COLNÉ. No, sir.

(G) This is an error on my part. They are bankers. I was thinking then of the Société de Travaux Publics et Construction.

The CHAIRMAN. Artigue, Sonderegger & Co. are in there too; are they not?

Mr. COLNÉ. Yes; there are three or four besides that.

The CHAIRMAN. Baratoux, Letellier & Co.?

Mr. COLNÉ. Yes.

The CHAIRMAN. Jacob's heirs?

Mr. COLNÉ. Yes.

The CHAIRMAN. Couvreur, Hersent & Co.?

Mr. COLNÉ. Couvreur, Hersent & Co. were the first parties, when Mr. de Lesseps came over here, that nominally made a contract with the Panama Canal Company to take the whole work themselves. That was intended to look well in the picture.

The CHAIRMAN. Then there is Hugo Oberndorffer?

Mr. COLNÉ. Yes; that is another.

The CHAIRMAN. Was he a contractor?

Mr. COLNÉ. A contractor, I believe; I am not sure.

The CHAIRMAN. If I understand, these people had controversies with the old Panama Canal Company when it failed?

Mr. COLNÉ. Yes, sir.

The CHAIRMAN. As to their conduct in dealing with it before it had failed?

Mr. COLNÉ. The controversy arose after the company failed, but it was during the time that the old company existed that these claims arose that the company had against them.

The CHAIRMAN. That is what I wanted to know. Now it was in compromise of these claims that they agreed to subscribe to the stock of the new company?

Mr. COLNÉ. Yes, sir.

The CHAIRMAN. Did that include the men you have just mentioned here?

Mr. COLNÉ. Yes.

The CHAIRMAN. I see that the liquidator has stock to the amount of 15,895,000 francs.

Mr. COLNÉ. Does it give his name, Monchicourt?

The CHAIRMAN. The name is not given. It says the liquidator.

Mr. COLNÉ. I may say in connection with that that when Mr. Monchicourt became liquidator he made an annual report. The

report of 1890, which was directly after the failure, is a very interesting one. I will try to get that for you. I think I have it at home.

The CHAIRMAN. It will not do us any good, unless we can get a translation of it.

Mr. COLNÉ. Well, I will give you the gist of this. The translation would be rather a long job.

The CHAIRMAN. In giving us what you do, you had better give us a translation of the text, as far as you go. We do not want your opinion on it; we want the facts.

Mr. COLNÉ. No, I will not give you anything except what the facts are.

The CHAIRMAN. What funds were in the hands of the company—and by funds I mean money and available or quick assets—at the time of its failure—about how much?

Mr. COLNÉ. I could not answer that.

The CHAIRMAN. Were there any?

Mr. COLNÉ. Yes.

The CHAIRMAN. There were some?

Mr. COLNÉ. Yes.

The CHAIRMAN. Do you know anything about the fund to which the liquidator resorted to get the money to subscribe and pay for 15,895,000 francs of this new stock, or of the stock in the new company?

Mr. COLNÉ. You mean what funds he drew it from?

The CHAIRMAN. Yes; where did he get the money?

Mr. COLNÉ. Well, that very statement I am speaking of, for 1890, will give you that.

The CHAIRMAN. The sources from which he got the money?

Mr. COLNÉ. Yes, the balance sheet. It will give you exactly what he had in hand, and how much he had expended, and how much he received, and under what loan, and all that sort of thing.

(H) The liquidator's report of 1891 shows available:

	Francs
Cash in Panama.....	867, 720. 57
Cash in Paris	385, 002. 46
Values on hand	9, 507, 000. 00
	<hr/>
	10, 759, 723. 03
In 1890 the total was.....	16, 274, 238. 57

The CHAIRMAN. Were you in Paris at any time during your agency for this company?

Mr. COLNÉ. I was there in 1889, sir; directly after the failure of the company.

The CHAIRMAN. Directly after the failure?

Mr. COLNÉ. Yes.

The CHAIRMAN. It was while you were there that your connection with the company terminated?

Mr. COLNÉ. No; it terminated here in New York, but I was sent over by an American syndicate to see if I could buy the Panama Railroad.

The CHAIRMAN. You went for the purpose of buying the railroad?

Mr. COLNÉ. Yes.

The CHAIRMAN. How much of the stock of the railroad company did the old Panama Canal Company own at the time you went over?

Mr. COLNÉ. Nearly every share, with the exception, I think, of a little over a thousand shares.

The CHAIRMAN. Did you buy the railroad or make a contract for it?

Mr. COLNÉ. No, sir; I could not. The Government came to the aid of the receiver and authorized him to sell some of the old bonds at 105 francs, redeemable at 400 francs.

The CHAIRMAN. What old bonds; the old bonds of the company?

Mr. COLNÉ. Yes.

The CHAIRMAN. How was he to sell them—at 105 francs you say?

Mr. COLNÉ. At 105 francs. That was the sale price and they were to be redeemed at 400 francs.

Senator KITTREDGE. Do you mean the lottery bonds?

Mr. COLNÉ. The lottery bonds, yes; and 60 francs of each subscription was held aside for a redemption fund, or the lottery fund. The receiver, Mr. Brunét, received actually in cash only 35 francs for each bond.

Senator KITTREDGE. What was the face value of these bonds?

Mr. COLNÉ. Four hundred francs.

The CHAIRMAN. You say the Government came to the assistance of the company?

Mr. COLNÉ. Yes.

The CHAIRMAN. In what way—by an act of assembly?

Mr. COLNÉ. By an act of the assembly. Mr. Brunét first applied to the council of ministers, which is the first step to take. They refused him. Things were in a very critical state then. I got this direct from Mr. Brunét, because in my negotiations with him he was very friendly and very pleasant. He applied to the council of ministers. They refused him, and as he had not any money at all, not a cent, he said to them, substantially, "Now, unless you grant me this authority, I wish you to understand the elections are coming on and I have got 800,000 subscribers, and you will hear from them."

So, subsequently, a few months after that, I think it was about a month after that, the authority was granted him. I will send you the prospectus of that loan.

The CHAIRMAN. What were the subscriptions of those people?

Mr. COLNÉ. Some of the old lottery bonds that were remaining in the treasury of the company.

The CHAIRMAN. There were not 800,000 of them, were there?

Mr. COLNÉ. The bonds that had been subscribed before were by 800,000 people.

The CHAIRMAN. You mean the bonds and the stock, do you not?

Mr. COLNÉ. All of it; yes.

The CHAIRMAN. The bonds, the stock, and the lottery bonds?

Mr. COLNÉ. The lottery bonds, the other bonds, and the stock.

Senator HANNA. Where did you get those figures?

Mr. COLNÉ. I got them from Mr. Brunét.

Senator HANNA. That is what he told you?

Mr. COLNÉ. Yes.

The CHAIRMAN. I notice here a subscription by the "Administrators of the old company, 7,885,000 francs." Do you know who were the administrators of the old company, and how that office was created, and what it had to do—what its duties were?

Mr. COLNÉ. How does it read there, Mr. Senator?

The CHAIRMAN. I read it to you exactly, "Administrators of the old company, 7,885,000 francs." Who were the administrators of the old company; what was their office, what was their function?

Mr. COLNÉ. They had a short function. They did not stay there but a very short time. I do not remember that loan at all. That may be perhaps connected with Mr. Brunet's affair, instead of the administrator's, for aught I know.

The CHAIRMAN. You do not know any such office in the old company as the administrators?

Mr. COLNÉ. Oh, they did have such for a short time.

The CHAIRMAN. What did they do?

Mr. COLNÉ. Very little.

The CHAIRMAN. What were their duties?

Mr. COLNÉ. Very little.

The CHAIRMAN. They must have had some duties to perform.

Mr. COLNÉ. You mean as to their duties?

The CHAIRMAN. Yes.

Mr. COLNÉ. They were supposed to conduct and wind up the affairs of the company, but an application was made to the court, and Mr. Brunet was appointed the receiver. Then he did the business.

The CHAIRMAN. He superseded the administrators?

Mr. COLNÉ. Yes; and subsequently Mr. Brunet died and Mr. Monchicourt was appointed then the liquidator. He is the man who made the new contract with the new company.

The CHAIRMAN. I thought that was made by the present liquidator.

Mr. COLNÉ. That is the man. His name is Monchicourt.

The CHAIRMAN. We have his name as Gautron.

Mr. COLNÉ. (I) Mr. Gautron was the successor to Monchicourt, and I believe the latter is dead. Gautron was appointed in his place. When the present company was organized then, Mr. Hutin was made president. He formerly had a position in the old company, connected with the works.

The CHAIRMAN. Was not he the liquidator of the old company?

Mr. COLNÉ. No, sir.

The CHAIRMAN. Then there is another liquidator mentioned by Mr. Lampre in his testimony here, speaks of the liquidator for the bondholders. Do you know of such an office as that?

Mr. COLNÉ. Oh, that representative has been appointed by a meeting of the bondholders. I think that took place a little after I left Paris. A meeting of the bondholders appointed him. I forget what his name was. They appointed him to take care of their own interests—that is, to see that things were carried out properly.

The CHAIRMAN. Do you know who he was?

Mr. COLNÉ. I can not remember now who he was.

Senator FOSTER, of Louisiana. Is he an officer of the court?

Mr. COLNÉ. No; he was appointed by a meeting that was held in Paris.

The CHAIRMAN. By the bondholders' meeting?

Mr. COLNÉ. The bondholders' meeting, yes. I saw one of those meetings; I saw two of them in fact.

The CHAIRMAN. You attended the meetings?

Mr. COLNÉ. Yes; simply as an onlooker, however.

The CHAIRMAN. But you attended the meetings of the bondholders?

Mr. COLNÉ. I did not take any hand in the discussion or anything else. I simply wanted to know what the feeling was.

The CHAIRMAN. What did the old company pay for this Panama railroad stock? What did it cost them?

Mr. COLNÉ. There was \$250 per share. There was about \$16 more for a distribution of the assets, and about \$14 more for delayed interest; that is, the shares were to be paid in eighteen months. A certain amount of interest was allowed for that time, which brought it up about \$14, so that for the shares then sold there was paid \$280.

The CHAIRMAN. Two hundred and eighty?

Mr. COLNÉ. Yes.

The CHAIRMAN. Now, where were those shares at the time they were bought by the Panama Canal Company? At what place were they held, chiefly?

Mr. COLNÉ. They were held here in the United States, sir.

The CHAIRMAN. In the United States?

Mr. COLNÉ. Yes. I do not believe there was a share in Europe.

The CHAIRMAN. And the railroad company was organized here?

Mr. COLNÉ. It was organized under an American charter; yes.

The CHAIRMAN. You found it impossible to buy that railroad stock when you went to Paris?

Mr. COLNÉ. Yes; owing to the fact that the Government came to the rescue of the receiver, by granting him that loan.

Senator HANNA. Did you make any offer for the stock?

Mr. COLNÉ. Yes; but I had rather not state it.

Senator HANNA. I think we had better have the price.

The CHAIRMAN. Yes; let us see what it was.

Mr. COLNÉ. Well; I do not like to say.

Senator HANNA. We must have the price.

The CHAIRMAN. Yes; we want the testimony.

Mr. COLNÉ. It was in the nature of a loan that we were to give them, and the shares were to be held as security.

Senator HANNA. I do not care anything about the transaction. I simply want to know the price per share you offered for the stock.

Mr. COLNÉ. I did not offer a price. I said it was in the nature of a loan.

Senator HANNA. You said first you did offer a price.

Mr. COLNÉ. Well, probably that was a slip of the tongue, if I did.

Senator HANNA. I guess the other was a slip too.

Mr. COLNÉ. You may be sure it is not.

Senator HANNA. I must ask for an answer to that question.

The CHAIRMAN. That is right. We must have an answer.

Mr. COLNÉ. I have answered it.

The CHAIRMAN. If you want to explain the transaction, you can do so.

Mr. COLNÉ. I will explain it. I went over there to offer them a loan of money, and for that they were to give us as a guaranty in shares of the Panama Railroad.

Senator HAWLEY. That was practically offering a price.

Mr. COLNÉ. Well, I don't know; it was not a sale. It was a collateral. The shares were to be collateral to the loan, and if they did not repay the loan then it would have been a sale, sure.

Senator HANNA. At what price did you estimate the value of the stock as collateral?

Mr. COLNÉ. I never came to that; never went as far as that.

Senator HANNA. It is a very strange transaction.

Mr. COLNÉ. It is not at all strange, simply because the Government came to the rescue.

Senator HANNA. What was the amount of the loan that you offered?

Mr. COLNÉ. I offered about, I suppose—I can not remember—I think it was five million.

J. On consulting my notes I find I made a mistake. The amount of the loan was to be only five millions.

Senator HANNA. Five million for how much stock?

Mr. COLNÉ. I say it had not got that far.

Senator HANNA. How much stock were they to put up as collateral for the loan of \$5,000,000?

Mr. COLNÉ. If you will excuse me, I said it had not come to that, simply because in the meantime the Government came to the rescue of Mr. Brunet and let him have money, so that I did not get any further than that.

Senator HANNA. You just offered to loan them \$5,000,000?

Mr. COLNÉ. Yes; if we could agree.

Senator HANNA. If you could agree upon the collateral?

Mr. COLNÉ. Yes; but it never came to a head, simply because in the meantime——

Senator HANNA. But when you made the offer to loan them \$5,000,000 did you not specify as to what the collateral should be?

Mr. COLNÉ. Yes; shares of the railroad.

Senator HANNA. How many shares of the railroad?

Mr. COLNÉ. Not mentioned.

Senator HARRIS. You stated how many shares of the railroad stock they had a while ago.

Senator HANNA. Were they to put up all they had?

Mr. COLNÉ. No, sir; not all.

Senator HANNA. Well, about how much?

Mr. COLNÉ. Well, how can I tell you, when I did not consummate the thing?

Senator HANNA. That is an evasion. I do not want that kind of an answer.

Mr. COLNÉ. It is not. It is exactly the fact.

Senator HAWLEY. You can tell us what you expected to get.

Senator HANNA. All right; let it go.

The CHAIRMAN. Did you expect to make that loan of \$5,000,000 on less collateral than the whole amount of the shares of the railroad company held by the old Panama company?

Mr. COLNÉ. Yes.

The CHAIRMAN. How much less?

Mr. COLNÉ. Well, I would say the same thing again, that I never came to the exact amount to be secured.

The CHAIRMAN. Well, I suppose you went as the agent of the syndicate?

Mr. COLNÉ. Yes.

The CHAIRMAN. They gave you instructions?

Mr. COLNÉ. They gave me instructions, and I reported to them as things went on.

The CHAIRMAN. At what rate did they instruct you to take that stock as collateral for the five-million-dollar loan?

Mr. COLNÉ. What do you mean?

The CHAIRMAN. At what rate per share?

Mr. COLNÉ. They never did. I reported just as I went along. It never came to a head.

The CHAIRMAN. How many shares did they instruct you to accept as a collateral for the loan of \$5,000,000?

Mr. COLNÉ. I say the same thing again—that as we could not effect a loan, the amount of shares which were to be put up as collateral has never been defined.

The CHAIRMAN. I am speaking now of what your principals, the syndicate in New York, instructed you to do with the Panama Canal Company. How much of the stock of the company were you authorized to accept as collateral for the loan of \$5,000,000?

Mr. COLNÉ. Well, Mr. Senator, I must repeat what I said, that that part of it had not been defined.

The CHAIRMAN. You went there, then, with what we call a *delcredere* commission; that is, with full power to negotiate this loan?

Mr. COLNÉ. No, sir; I went there to report facts, and that I was to be told what I had to do. That is what I went for.

The CHAIRMAN. You did not go there, then, to make the contract?

Mr. COLNÉ. No, sir; not to do it without instructions. That is the reason why it may seem strange.

The CHAIRMAN. You went there to get the facts and make report to your principals, and then they were to determine what they were willing to give?

Mr. COLNÉ. That is the case exactly, sir.

The CHAIRMAN. Or to take, rather, as collateral for that \$5,000,000 loan?

Mr. COLNÉ. Yes.

The CHAIRMAN. And you say that was broken up by the fact that the French Government came to the assistance of the Panama Canal Company?

Mr. COLNÉ. Yes.

The CHAIRMAN. In what way?

Mr. COLNÉ. In authorizing that loan that I just now mentioned, to be issued at 105 francs, for a bond of 400 francs.

The CHAIRMAN. Was that a lottery loan?

Mr. COLNÉ. Yes.

The CHAIRMAN. That is the loan that was to be distributed by lottery when payments were ready to be made upon these bonds?

Mr. COLNÉ. Yes. You must know that bonds were already in existence, and many shares had been subscribed. This was a balance that remained in the treasury, which he was authorized to sell.

The CHAIRMAN. What was the value of the Panama Canal stock or any of its bonds on the Bourse at the time you were there?

Mr. COLNÉ. O well, I have got all those different prices, but I could not remember that.

The CHAIRMAN. You do not remember?

Mr. COLNÉ. No, I could not give it to you. You mean at the time the company failed?

The CHAIRMAN. At the time you went there for the purpose of buying that railroad stock.

Mr. COLNÉ. That is the same time, sir. I can give you that, but I have not got it here.

The CHAIRMAN. You do not remember?

Mr. COLNÉ. No, sir.

K. The last quotation I have of the Bourse is December 31, 1888:

	Francs.
Shares, 500 francs	124
Bonds, 5 per cent.....	132
Bonds, 3 per cent.....	97
Bonds, 4 per cent	98
New bonds, first series.....	150
New bonds, second series	145

Senator KITTREDGE. Who was at the head of the syndicate that sent you over to Paris?

Mr. COLNÉ. I would rather not say. There was a syndicate made up of several gentlemen.

Senator KITTREDGE. Are you willing to give us the name of any gentleman connected with that syndicate?

Mr. COLNÉ. I was sent by Mr. E. D. Adams, of New York.

Senator HANNA. Of the firm of Winslow, Lanier & Co.?

Mr. COLNÉ. Yes.

The CHAIRMAN. I believe you said you would rather not tell.

Mr. COLNÉ. Well, I have told now.

The CHAIRMAN. I want to say this is not a sentimental meeting. We are after facts here, and witnesses must answer the questions.

Mr. COLNÉ. Mr. Senator, I think, so far, I have been straightforward. I have told you the story just as I know it.

Senator HAWLEY. About how many claimants are there in France? How many people have stock or obligations of any kind that have been made as claims against this company in case it goes on and builds a canal?

Mr. COLNÉ. About 800,000 subscribers.

Senator HAWLEY. About 800,000 people?

Mr. COLNÉ. Yes.

Senator HAWLEY. Is that all?

Mr. COLNÉ. It was one of the most popular loans you ever saw in your life.

Senator HAWLEY. It is not now?

Mr. COLNÉ. No, sir; not very.

The CHAIRMAN. Mr. Colné, do you know anything about the traffic relations between the Panama Railroad Company and the Pacific Mail Company?

Mr. COLNÉ. Yes.

The CHAIRMAN. State what you know about that.

Mr. COLNÉ. The Pacific Mail Company was made the general agent of the Panama Railroad, and all freight, all collections of money, and everything of that kind was done through the Pacific Mail. The Panama Railroad received a certain subsidy every month from the Pacific Mail.

The CHAIRMAN. How much?

Mr. COLNÉ. Seventy-five thousand dollars a month. It was \$90,000 a month at one time. Then it was reduced to \$75,000 a month, and subsequently to \$55,000.

The CHAIRMAN. How long did that relation continue between those two companies, within your knowledge?

Mr. COLNÉ. It continued up to the time that I left, and I think it continued from then until the Panama Railroad started the line of steamers that they are now running.

Senator HANNA. When was that?

Mr. COLNÉ. Let me see. It must have been about four or five years ago; maybe six years ago.

Senator HANNA. At what time did you leave?

Mr. COLNÉ. I left in 1889.

The CHAIRMAN. What line of steamers do you refer to now?

Mr. COLNÉ. Steamers run now by the Panama Railroad.

The CHAIRMAN. Between what points?

Mr. COLNÉ. Between Colon and New York.

The CHAIRMAN. Any on the other side?

Mr. COLNÉ. No, sir; on this side.

The CHAIRMAN. All on this side?

Mr. COLNÉ. Yes.

The CHAIRMAN. Now, do you know anything about the earnings of the railroad during the period when you had acquaintance with this subject?

Mr. COLNÉ. Yes; I can tell you what dividends were declared.

Senator HAWLEY. Dividends of what?

Mr. COLNÉ. The Panama Railroad.

Senator HANNA. Were you at any time connected with the Panama Railroad?

Mr. COLNÉ. All the correspondence came through my hands that we sent over to Paris. The whole Panama Railroad was under the supervision of the Panama Canal Company in Paris. Do you want this during the time I was there, or do you want it further back? I have it from 1878.

The CHAIRMAN. Where did you get it?

Mr. COLNÉ. I got it from the official reports of the Panama Railroad.

The CHAIRMAN. I should like to have all that you know about it, then.

Mr. COLNÉ. In 1878 their dividend was fifteen and a quarter.

Senator HANNA. Per cent?

Mr. COLNÉ. Yes. In 1879, it was 13 per cent; in 1880, 16 per cent; in 1881, 34½ per cent.

I should explain that 1881 was the time of the sale of the assets and of the shares, which, of course, was an abnormal rate at that time. It was not subsequently. In 1882 it was 12½ per cent; in 1883, 13½ per cent; in 1884, 16 per cent; in 1885, 10 per cent; in 1886, no dividend; in 1887, 6 per cent.

During the three last years that I have named Colon was burned. The railroad lost considerable. We had some dishonest employees that ran off with money, and the dividends were reduced, as you will see, there in 1887 to 6 per cent. In 1886 none at all could be declared.

Senator HANNA. But they took the earnings to rebuild their property?

Mr. COLNÉ. Yes. In 1888 it again became 23 per cent. In 1889, the year of the failure, it came down to 9 per cent; and 60 per cent of the traffic was off. Those dividends—that, as you see, are very fair dividends—were caused principally by the work that was given by the canal to the railroad. There was considerable transportation of men, machinery, goods, and so forth.

Senator HANNA. Did those dividends embrace the total net earnings of the property?

Mr. COLNÉ. I think, as far as I remember, a certain amount was set aside for a sinking fund, besides.

Senator HANNA. For what purpose was that sinking fund?

Mr. COLNÉ. They had some bonds in England; the amount has been reduced considerably. The amount is not near so large, but a sinking fund has been provided for to redeem them.

Senator HANNA. All the bonds?

Mr. COLNÉ. Yes.

The CHAIRMAN. That Pacific mail line you speak of ran on the other side from Colon to San Francisco.

Mr. COLNÉ. At the time that the subsidy was paid to the Panama Railroad they ran both sides, both on this side and on the other side.

Senator HANNA. How long was that contract in force?

Mr. COLNÉ. It was in force when I left. I don't know how long after that, 1889.

Senator HANNA. How many years had it been in force when you left?

Mr. COLNÉ. Six or seven years, to my knowledge.

The CHAIRMAN. It was in force before that, was it not?

Mr. COLNÉ. O, yes, I think it was, but to my knowledge it was then.

The CHAIRMAN. What was the object or purpose of establishing an American committee to consider and to take care of the Panama affairs?

Mr. COLNÉ. Well, the appointment read somewhat in this way: "To further the interests of the Panama Canal in America and do whatever would be necessary to further its interests," etc. There was no specific duty mentioned.

The CHAIRMAN. Well, it might properly be described, I suppose, by this phrase: To Americanize the canal.

Mr. COLNÉ. Well, I believe that was part of it.

Senator HANNA. What would be the process of Americanizing the canal?

Mr. COLNÉ. There are many to be used; I don't know. There are some different ways. I suppose the Senator knows how it can be done.

Senator HANNA. I don't know; I ask for information.

The CHAIRMAN. I have no further questions to ask. Now, Mr. Colné, it is impossible for your deposition to be completed until those papers we have referred to are incorporated, so that you will be compelled to take it with you to New York. I shall make this requirement of you, not to change the purport of a word that is in this record, and when I send the papers to you and you have finished it and put in these new documents that you have not yet produced, or copies of them, or translations, we will require of you that you go before a notary and make affidavit that your statements are all true.

Mr. COLNÉ. I shall do that with pleasure.

The subcommittee (at 12 o'clock noon) took a recess until Tuesday, February 18, at 10.30 o'clock a. m.

LAWS AUTHORIZING LOANS FOR THE PANAMA CANAL.

LAW UPON LOTTERY BONDS.

June 8, 1888.

The Senate and the Chamber of Deputies have adopted and the President of the Republic has promulgated the law the text of which follows:

ARTICLE I. The Universal Interoceanic Panama Canal Co. is authorized to issue securities up to the amount of six hundred million francs (600,000,000 francs) redeemable with lots, by means of drawings, on the following conditions:

1st. The securities issued shall bear an annual interest, the rate of which will not be less than 3 per cent of the nominal capital.

2nd. The total annual amount set aside under the form of lots shall not in any case exceed 1 per cent of the capital.

3rd. The nominal value of the securities issued shall not be less than three hundred francs (300 francs); the ulterior issue of fractional parts of securities is prohibited.

4th. The redemption of these securities in a maximum period of 99 years and the payment of lots shall be guaranteed by a sufficient deposit for a special purpose of French "rentes" or securities guaranteed by the French Government. The Universal Interoceanic Panama Canal Co., to provide for the guarantee imposed upon it, is authorized to increase, under the same conditions, the said loan of six hundred million francs (600,000,000 francs) to the sum necessary for the creation of this guarantee fund. Such an increase of the loan shall not exceed 20 per cent of the sum of the principal.

ART. II. Eventually should the Universal Interoceanic Panama Canal Co. convert all or a part of its old bonds, the stipulations of Article I shall be applicable to the new bonds created in virtue of such a conversion.

ART. III. All machinery necessary for the accomplishment of the work shall be made in France.

The raw materials shall be of French origin.

ART. IV. All prospectuses, show bills, publications, and other documents destined for publication shall be of the same size of type as those used for the advertisement of the loan, and below the amount of the loan shall appear the words:

"Loan authorized in conformity to the prescriptions of the law of May 21st, 1836, by the law of June 8th, 1888, but without any guarantee or responsibility from the State (État)."

The same mention shall be inserted on the head of the provisional or final bonds delivered to subscribers.

All infractions to the above provisions may cause the withdrawal of the authority by a simple decree of the minister of finances.

The present law, deliberated and adopted by the Senate and by the Chamber of Deputies, shall be executed as a State law.

Made in Paris on the 8th of June, 1888.

(Signed)

CARNOT.

By the President of the Republic:

The minister of finances,

(Signed)

P. PEYTRAL.

Law of July 15th, 1889.

ARTICLE I.

The liquidator of the Universal Interoceanic Panama Canal Co. is authorized to negotiate, without limit of price and without interest, such of the bonds with lots the issue of which has been authorized by the law of June 8th, 1888, which have not yet been sold on February 4th, 1889, the date of the dissolution and when the said company was thrown into liquidation.

The money realized from the negotiation of said bonds will be free from seizure up to thirty-four million of francs.

In case the liquidation should transfer or cede the whole or part of the assets of the liquidation to a company organized for finishing the canal, the new company shall not issue the bonds at that time not sold otherwise than in the conditions determined by the law of June 8th, 1888, concerning the minimum of the selling price and the payment of interest.

ARTICLE II.

As fast as the bonds upon which the full payment has not been made issued for creating the guarantee capital prescribed by article first of the law of June 8th, 1888, the liquidator shall pay the balance of the sum due to the civil company, which has been organized for the creation of the said capital.

The deposits made by the civil company in virtue of the law of June 8th, 1888, and of the present law can not be withdrawn and shall preserve their special attribution up to a complete freedom from the charges of the guarantee of lots and the redemption of the capital.

GENERAL CONDITIONS OF THE SUBSCRIPTION.

All the holders of shares or bonds of the Universal Interoceanic Panama Canal Co. will have a right of preference from the subscription of 300,000 securities out of the 357,894 included in the present issue. The application shall indicate the nature (shares or bonds), the quantity, and the numbers of securities held. The apportionment will be made between these privileged subscribers proportionately to the number of securities held and subscribed for by each. The securities may be required at the apportionment to be stamped.

The total amount of the payments due to the civil company charged with the care of the guarantee funds created by the law of June 8th, 1888, has been deposited for each of the bonds about to be subscribed.

All subscriptions carry with them the adhesion to the by-laws of the said company.

There will be delivered at the time of subscription a receipt of the first payment of twenty francs.

As soon as notice is given of the distribution, and up to August 14th, inclusive, the additional instalment of eighty-five francs shall be paid at the place where the subscription was made. The receipts will be exchanged at the same place for bonds to bearer.

Delayed payments will bear interest at 5 per cent.

The bonds delivered in exchange for receipts of payments will alone be entitled to take part in the drawings, the first of which will take place August 16th, 1889.

The bonds on which the payment of eighty-five francs has not been made in due time can be sold at the Bourse of Paris, without notice, commencing from September 5th, 1889, for the account and at the expense and risk of the owners.

The necessary formalities for the admission of the bonds to official listing will be taken at the proper time.

The civil company, according to the declaration of the liquidator, is the owner of Government "rentes" and of values guaranteed by the Government amounting to 90,293,202.53 fcs. independently of the payments to be received from the bonds not liberated from former subscriptions.

These "rentes" and values are deposited at the Crédit Foncier, of France.

The annual revenue of the said "rentes" and values amount at the present time to 3,438,875.50 fcs., a sum above the annual amount of the lots.

THE CIRCULAR READS:

Public subscription to 357,894 bonds with lots.

Price of subscription, 105 francs.

Payable as follows:

20 francs on subscribing.

85 francs at allotment (from Aug. 5th to 15th, 1889).

Redeemable at 400 francs, payment of lots is guaranteed by a deposit at the Crédit Foncier, of France, of French rentes or securities guaranteed by the French Government according to the law of June 8th, 1888.

Tableau des lots tirés chaque année.

6 TIRAGES PAR AN, DU 16 AOÛT 1889 AU 15 JUIN 1913.

[3 lots de 500,000 francs, 3 lots de 250,000 francs, 6 lots de 100,000 francs, etc.]

16 août.	15 octobre.	15 décembre.
<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
1 lot de..... 500,000	1 lot de..... 250,000	1 lot de 500,000
1 lot de..... 100,000	1 lot de..... 100,000	1 lot de 100,000
2 lots de 10,000..... 20,000	2 lots de 10,000..... 20,000	2 lots de 10,000 20,000
2 lots de 5,000..... 10,000	2 lots de 5,000..... 10,000	2 lots de 5,000 10,000
5 lots de 2,000..... 10,000	5 lots de 2,000..... 10,000	5 lots de 2,000 10,000
50 lots de 1,000..... 50,000	50 lots de 1,000..... 50,000	50 lots de 1,000 50,000
15 février.	15 avril.	15 juin.
<i>Francs.</i>	<i>Francs.</i>	<i>Francs.</i>
1 lot de..... 250,000	1 lot de..... 500,000	1 lot de 250,000
1 lot de..... 100,000	1 lot de..... 100,000	1 lot de 100,000
2 lots de 10,000..... 20,000	2 lots de 10,000..... 20,000	2 lots de 10,000 20,000
2 lots de 5,000..... 10,000	2 lots de 5,000..... 10,000	2 lots de 5,000 10,000
5 lots de 2,000..... 10,000	5 lots de 2,000..... 10,000	5 lots de 2,000 10,000
50 lots de 1,000..... 50,000	50 lots de 1,000..... 50,000	50 lots de 1,000 50,000

Par an, 366 lots s'élevant à francs 3,390.000.

Tableau des lots tirés chaque année—Suite.

4 TIRAGES PAR AN, DU 16 AOÛT 1913 JUSQU'À COMPLET AMORTISSEMENT.

[2 lots de 500,000 francs, 2 lots de 250,000 francs, 4 lots de 100,000 francs, etc.]

16 août.	15 novembre.	15 février.	15 mai.
<i>Francs.</i> 1 lot de 500,000 1 lot de 100,000 1 lot de 10,000 1 lot de 5,000 5 lots de 2,000.. 10,000 50 lots de 1,000.. 50,000	<i>Francs.</i> 1 lot de 250,000 1 lot de 100,000 1 lot de 10,000 1 lot de 5,000 5 lots de 2,000. 10,000 50 lots de 1,000. 50,000	<i>Francs.</i> 1 lot de 500,000 1 lot de 100,000 1 lot de 10,000 1 lot de 5,000 5 lots de 2,000. 10,000 50 lots de 1,000. 50,000	<i>Francs.</i> 1 lot de 250,000 1 lot de 100,000 1 lot de 10,000 1 lot de 5,000 5 lots de 2,000.. 10,000 50 lots de 1,000.. 50,000

Par an, 236 lots s'élevant à francs 2,200,000.
Le paiement des lots aura lieu un mois après chaque tirage.

STATE OF NEW YORK, *County of Kings, ss:*

I hereby certify that the within testimony from page 1 to 51 is true to the best of my recollection, that the notes marked A to K on yellow paper have been drawn from documents in my possession, and that the annexed documents headed Laws authorizing loans for the Panama Canal are true translations of papers also in my possession.

C. COLNÉ.

Sworn to before me this 28th day of February, 1902.

[SEAL.]

WILLIAM FERRIS,
Notary Public, Kings Co.

STATEMENTS

OF

EDWARD A. DRAKE AND CHARLES PAINE

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Wednesday, February 26, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Mitchell, Turner, and Foster, of Louisiana.

Also, Senators Kittredge, Millard, and Harris, members of the committee.

Mr. Edward A. Drake, second vice-president and secretary of the Panama Railroad Company, and Mr. Charles Paine, general manager of the Panama Railroad Company, appeared, and were duly sworn by the chairman.

STATEMENT OF EDWARD A. DRAKE.

The CHAIRMAN. Please give your name?

Mr. DRAKE. Edward A. Drake.

The CHAIRMAN. And your residence?

Mr. DRAKE. My residence is 302 West One hundred and first street, New York City.

The CHAIRMAN. And your official position?

Mr. DRAKE. Vice-president and secretary of the Panama Railroad.

The CHAIRMAN. How long have you been connected with that railroad?

Mr. DRAKE. Since April 1888, in various official capacities; until the last two years I have been second vice-president and secretary.

The CHAIRMAN. Have you ever had the personal supervision of the books?

Mr. DRAKE. That is my department.

The CHAIRMAN. Do you know the financial situation?

Mr. DRAKE. I do, sir. I am the executive officer.

The CHAIRMAN. What is the amount of outstanding stock in that company now?

Mr. DRAKE. About 70,000 shares, sir; \$7,000,000.

The CHAIRMAN. How much of that stock is owned by the Panama Canal Company?

Mr. DRAKE. About 69,000 shares, sir, approximately.

The CHAIRMAN. Do you know where the rest of it is held?

Mr. DRAKE. There are fifty-six other stockholders, and of that stock less than a thousand shares are held in the United States and the balance abroad.

The CHAIRMAN. Do you know in what country?

Mr. DRAKE. Oh, yes; in France and in England. There are stock-

holders in both those countries. There is a list of the shareholders filed with the Isthmian Canal Commission.

The CHAIRMAN. That is not an interest-bearing stock, is it?

Mr. DRAKE. It pays dividends. It has not paid any recently, because the earnings have been applied to betterments and the construction of this very important pier at La Boca, which cost us something over \$2,000,000. The last dividend was paid in March, 1901, and was 2 per cent, and the last previous one was paid in January, 1893.

The CHAIRMAN. As you have mentioned that pier, I will get you to state the agreement between the Panama Canal Company and the Panama Railroad Company under which that pier was constructed.

Mr. DRAKE. As the canal company were engaged in constructing their canal, and had all of the plant necessary for that work, which could be put into operation much more advantageously than could be done by a new contractor, a formal contract was entered into between the companies by which the canal company as contractor undertook to construct the pier for us within a given time, and to construct it at cost, to advance us temporarily that cost to the extent of \$1,000,000. The pier cost a little over \$2,000,000, and the balance of this cost of construction was supplied from the assets of the company, from the current funds of the company.

The CHAIRMAN. Of what company?

Mr. DRAKE. Of the Panama Railroad Company. The indebtedness to the canal company is now practically liquidated. The debt was not due for five years from the date of completion of the work, October 15, 1900, but we have been able to anticipate payment and are just about closing it up now. The final payment is to be made within a few days.

The CHAIRMAN. Was it any part of the contract of the railroad company with Colombia, and with the concessions otherwise, to construct this pier?

Mr. DRAKE. None whatever. It was done for the purpose of doing away with the old and cumbersome system of lighterage that we had in use there. That is very expensive and very cumbersome in comparison with modern methods of handling traffic. It is a very complete system of lighterage. We have two tugs and twenty-three lighters of from 100 to 300 tons each. They are iron and steel lighters; but the water is variable, and these vessels were discharged at the islands down the bay into these lighters, and the lighters were towed ashore and discharged to the railroad.

To do away with that, which was necessarily expensive, we constructed this wharf for the purpose of handling cargoes easily from ship to shore. There are heavy mechanical cranes, capable of transporting 3,000 pounds each, and one large derrick of 15 tons.

The pier is probably the most magnificent structure of its kind—certainly on the Pacific coast—and there are only two others like it in the world. It is built on caissons that are 15 feet above the water and 15 to 20 feet below it down to bed rock, built of concrete, 25 feet in diameter. It has iron trusses, and a branch of the railroad was constructed running down onto this pier; and cargoes are now discharged, and have been for a year, directly from our ships and those of the cocarriers onto the wharf. This has been completed under Mr. Paine. Much of this was completed and put into operation under Mr. Paine's experi-

ence and intelligent knowledge of such things and is now in satisfactory operation and has been for a year.

The CHAIRMAN. Before you constructed this pier your line of railroad ran into Panama?

Mr. DRAKE. Ran directly into Panama and had the terminal that it has used for the last fifty years, with wharves of the American style of construction, pile-driven and very expensive. Mr. Paine has diagrams of them. Everything had to be lightered. Since then we have taken advantage of the maritime channel of the canal and dredged a large basin. We have weekly reports of the condition of it. I have here a tracing of that basin. These are the reports of the condition of the depth, as made every week, by an experienced officer, showing the depth at all times. That is the basin of evolution, and a small basin alongside the pier. That shows that we have at all times a depth sufficient for the largest vessels to lie there safely.

The CHAIRMAN. Before you constructed this pier how far did you have to lighter?

Mr. DRAKE. About 3 miles from the islands in the bay.

The CHAIRMAN. From what depth of water, about?

Mr. DRAKE. At Panama there is a rise and fall of the tide of 20 feet. The tide recedes entirely from the old wharves in the bay of Panama, but it never does from this pier. It was to obviate that that the pier was constructed. We can operate it at all times, but when the tide is at the lowest ebb Panama is practically dry at our wharves.

The CHAIRMAN. Quite a beach?

Mr. DRAKE. Yes; it is a coral beach that runs out.

Mr. PAINE. Mud flats.

Mr. DRAKE. Yes.

The CHAIRMAN. For about what distance?

Mr. DRAKE. Coral beach for over 1 mile, shoaling for nearly the whole 3 miles, sir.

The CHAIRMAN. I have the depth here, shown on the hydrographic chart issued by the United States Hydrographic Office.

Mr. DRAKE. We have that, sir.

The CHAIRMAN. Those are mud flats, underneath which there is coral?

Mr. DRAKE. Yes.

Mr. PAINE. Underneath?

Mr. DRAKE. That is within the arm of the bay of the city proper. Our La Boca pier is located outside.

The CHAIRMAN. So that it was as much for the interest of the railway to have this channel dredged out to the shipping, so as to admit ships to come in and load or discharge cargo at the pier—

Mr. DRAKE. Yes.

The CHAIRMAN. As much to the interest of the railroad—

Mr. DRAKE. Yes. I might say in answer to that that the railroad under its concession had the right at any time to construct out to deep water in the bay of Panama. We found that deep water there. The canal had constructed this trench, and it was deep water sufficient, according to our construction, for us to extend our railroad, and we did it. We extended it to that trench.

The CHAIRMAN. The canal company constructed the trench?

Mr. DRAKE. The canal company had constructed the trench before, advantageously, which brought deep water to the shore, and under

our concession, which required that we must build out to deep water in the bay of Panama at some time, we took advantage of that and constructed it. It was a mooted question for a time, but it was finally adjusted with Colombia and decided that we were right in what we had done. Under article 4 of the concession the company bound itself to extend the railroad on the Pacific side to the islands of Naos, Culebra, Perico, and Flamenco, or other place in the bay where there may exist a permanent depth of water for large vessels. We found this permanent depth of water and built there.

The CHAIRMAN. You found a permanent depth of water made by the canal company, through the channel which they had dredged out?

Mr. DRAKE. Yes.

The CHAIRMAN. That channel commences where?

Mr. DRAKE. Commences at the island of Noas, down the bay, and runs some 5 or 6 miles inland, but not to a sufficient depth for vessels to go inland.

The CHAIRMAN. It runs up to Miraflores, does it not?

Mr. DRAKE. Yes.

The CHAIRMAN. So that what the railroad company did was to build this pier there and extend its tracks out upon the pier?

Mr. DRAKE. Yes.

The CHAIRMAN. How far distant from the coast line proper is this pier?

Mr. DRAKE. It is right on the coast line. I have a diagram of it here that will show. We had to build a short embankment about 500 feet, I think it is. Is not that the distance, Mr. Paine?

Mr. DRAKE. We built that short embankment to connect the land with the wharf [referring to the diagram]. There is the mainland, this is the embankment which runs out to connect the mainland with the pier.

The CHAIRMAN. What is the point at which this water separates that runs into the station?

Mr. DRAKE. La Bomba. The branch is known as the La Boca branch of the railroad. It was there before, but we have rerailed it, reconstructed it in the most modern fashion. It connects with the railroad at La Bomba.

The CHAIRMAN. You have a sort of circuit here it seems [referring to the diagram].

Mr. DRAKE. Yes; that is to say, in our own operations we extended this basin beyond the line of the axis of the canal and beyond the width of the canal, a basin of evolution, and put in mooring buoys. We have stationed mooring buoys all along, so that vessels can be warped in or out, in case more than three vessels should be at the pier. If a vessel had partly completed its discharge, it could be warped over to these buoys, as is done in other ports.

The CHAIRMAN. What is the width of that basin?

Mr. DRAKE. Three hundred and fifty meters, or 930 feet, is the full width, from the base of the pier across to our mooring buoys.

The CHAIRMAN. What is the depth of that basin?

Mr. DRAKE. It is 19 feet at dead low water. The small basin along side of the pier is 26 feet at dead low water.

The CHAIRMAN. There are two basins, then?

Mr. DRAKE. One is a small one, practically a berthing basin, so that no matter how extreme the ebb tide might be these ships can always lie

safely at that pier without touching bottom, and we have discharged vessels of 5,000 tons' capacity there, drawing 25 feet of water or 23 feet of water, and are regularly discharging vessels there of three and four thousand tons in the course of our business.

The CHAIRMAN. If this canal was carried out as projected by the Isthmian Canal Commission, you would have to deepen that to 36 or 35 feet.

Mr. DRAKE. I presume so, sir, but that is a mere matter of detail. We have a large marine dredge there in operation all the time to maintain the depth that we require.

The CHAIRMAN. Why do you have to maintain it?

Mr. DRAKE. Because the Rio Grande empties into the trench just above our pier, and whenever there are heavy torrents above our pier, and whenever there are heavy torrential rains, they bring down mud and silt, which naturally drift into the deepest excavations.

The CHAIRMAN. Right up there at the coast line proper, the mouth of the Rio Grande, we will say, there is a land spit which has formed, according to the maps that are here.

Mr. DRAKE. Yes.

The CHAIRMAN. Across the canal?

Mr. DRAKE. Where it varies from the extreme depth. There is either a cable laid there, I think, or a ford, and it varies from 5 or 6 feet but not more than that. It never has caused a shoal or a shallow, but it is a point where there is a variation in the depth.

The CHAIRMAN. Is there any drift in the sea there?

Mr. DRAKE. There is no drift, sir. There is a regular trend of the sea in a northwesterly direction; that is, the waves all trend that way, but there is no sea trend, no silt trend. Of course, when there are heavy floods—and there are occasional heavy rains—there is a certain amount of natural silting in the bottom that produces slight shoaling, and it is for that purpose, to maintain our extreme depth—as we have advised our co-carriers that they could always send their largest ships there safely—that the railroad, in its own interest, is engaged in maintaining these depths.

The CHAIRMAN. In estimating the cost of this pier at \$2,000,000—

Mr. DRAKE. That is the actual cost, sir.

The CHAIRMAN. In stating the cost of this pier at \$2,000,000 you include this dredging?

Mr. DRAKE. The cost of all that dredging up to the time that the construction account was closed.

The CHAIRMAN. I mean the enlargement of the basin; you include that?

Mr. DRAKE. Oh, yes; all the cost of that up to the time that the construction account was closed. Now it is chargeable to the cost of the operation of the railroad. Before that it was charged against the construction, but now it is charged to operating expenses.

The CHAIRMAN. Of the railroad?

Mr. DRAKE. Yes.

The CHAIRMAN. What was the cost of that enlargement of the basin there?

Mr. DRAKE. The entire cost of the pier is subdivided into enbankment, pier basin, and terminal facilities. I would have to refresh my memory as to the figures. I have not those statistics here.

The CHAIRMAN. Was it considerable?

Mr. DRAKE. The basin cost \$464,000, was it not, Mr. Paine, the cost of the basin of evolution?

Mr. PAINE. I could not tell you within \$100,000. I do not remember. It was before my time.

Mr. DRAKE. I can furnish that.

The CHAIRMAN. That was dredged before you went there, Mr. Paine, was it?

Mr. PAINE. Before I became connected with the road.

The CHAIRMAN. I wanted to ascertain what the nature of the bottom was.

Mr. DRAKE. Mr. Paine can tell you that fully. It was not constructed directly under my direction, under my official care. I submit that chart so that you may see how complete our soundings are. Soundings are reported at distances of 3 meters apart, every week, and the depth of that basin of evolution and the character of the bottom of that basin of evolution are completely shown in that way.

The character of the bottom of that basin is all soft mud, down to the depth that you see there, only down on the left-hand side there was one little point of rock, which has been blasted out. We had large operations with diving bells and with drills—70-foot drills—and it has all been removed down to 8 meters, or 24 feet. Then in the berthing basin a rock which appeared about two-thirds of the way down along the pier front, and which made what we called bank No. 2, has been blasted and excavated to the depth of 33 feet, and it is susceptible of being deepened to any extent, of course.

The CHAIRMAN. You had nothing to do with the dredging from the pier there (to the islands)?

Mr. DRAKE. Oh, yes; because nobody else was using it except ourselves; we are maintaining the depth there. We have not done any dredging for the last year and a half, but if it should become necessary, we would do so. The vessels move only at flood tide, or at a safe stage of the tide, but it is our purpose to maintain that depth as long as it may be necessary, for our own interests.

The CHAIRMAN. I wanted to know whether the railroad company had in anywise contributed to the digging of that ditch out of the shipping.

Mr. DRAKE. Not at all. We found it there.

The CHAIRMAN. Does the railroad company own any of these islands?

Mr. DRAKE. It has an undivided half in all of the principal ones. I have the deeds here showing that it has an undivided half interest.

The CHAIRMAN. Does the other half belong to Colombia?

Mr. DRAKE. The other half belongs to the Pacific Mail Steamship Company—another American company.

The CHAIRMAN. The sovereignty belongs to Colombia?

Mr. DRAKE. The sovereignty belongs to Colombia, but the property right is vested in the Pacific Mail Steamship Company and in the Panama Railroad Company.

The CHAIRMAN. When was that concession made?

Mr. DRAKE. The purchase was made of the islands in 1852.

The CHAIRMAN. It was a concession, after all, because Colombia has the sovereignty.

Mr. DRAKE. Oh, no; excuse me, if I differ. The islands were owned by private parties, the same as any islands in a bay, and were purchased in fee simple by the Pacific Mail Steamship Company, and we afterwards acquired a half interest.

The CHAIRMAN. What did they cost the railroad company?

Mr. DRAKE. \$14,757 in American gold, the islands of Perico, Culebra, Naos, and Flamento.

The CHAIRMAN. At the end of your concession, whenever that may come, that property will belong still to the railroad company?

Mr. DRAKE. Yes; the contract is very specific about what would revert to Colombia, either on the expiration or enforced termination of the contract.

The CHAIRMAN. As you did not buy from Colombia, nothing would revert to her so far as those islands were concerned?

Mr. DRAKE. No, sir; anything that we own in fee, or that has passed into the hands of third parties, would not revert.

The CHAIRMAN. Are those islands inhabited?

Mr. DRAKE. There are stations there. The Pacific Mail have coal sheds and shanties, or canteens, as they might be called, for their laborers, as they are $3\frac{1}{2}$ miles from the mainland.

Mr. PAYNE. It is a coaling station?

Mr. DRAKE. That is the only one that has any building on.

The CHAIRMAN. About how many of these islands are there?

Mr. DRAKE. Of those that we are concerned in, there are four. We have a half interest, a half ownership, in four.

The CHAIRMAN. How many besides those are there in the group?

Mr. DRAKE. None in that group.

The CHAIRMAN. They comprise the whole group?

Mr. DRAKE. Yes.

The CHAIRMAN. Those islands, and some others in the vicinity, are the islands that break the force of the Pacific from the anchorage of the ship, are they not? It is behind those islands that the ship anchors?

Mr. DRAKE. Yes; it is behind the principal island, the island of Naos, that they find their anchorage, and it is to that point that the trench of the canal is dug. Before they began using our wharf, all vessels coming to Panama entered there, in this cove.

The CHAIRMAN. Have you ever sounded it to know what the material is?

Mr. DRAKE. Oh, yes; we have written reports of it. We know every foot of it.

The CHAIRMAN. What is the material?

Mr. DRAKE. The material is all silt, sand, right out to the anchorage at the island of Naos, except at two points, where there are small ledges of rock which we reduced. Along the contour, extending about a thousand feet below our pier, there was a little ledge of rock, and we removed that.

The CHAIRMAN. What kind of rock is that?

Mr. DRAKE. Coral.

The CHAIRMAN. It is the coral that you ordinarily find there?

Mr. DRAKE. Yes; the great difficulty in operating on it is caused by the extremes of tide. As I stated, we have to use drills 70 feet long, but all that difficulty has been overcome and the rock has been removed.

The CHAIRMAN. Your contract in regard to this pier and this work you have done there was with Colombia, I understand?

Mr. DRAKE. No, sir.

The CHAIRMAN. Not with Colombia?

Mr. DRAKE. No, sir; our concession obligated us to extend the rail-

road to deep water in the Bay of Panama, and we undertook to meet that obligation by constructing a pier there, and employed the canal company as contractors to do the work at certain points. After that we carried it on ourselves.

The CHAIRMAN. When I referred to your contract, I meant your obligation.

Mr. DRAKE. Yes; the obligation was to the Republic of Colombia. Our concession obligated us to extend the road to deep water in the bay of Panama.

The CHAIRMAN. When does your concession expire?

Mr. DRAKE. In 1966. It has sixty-four years yet to run.

The CHAIRMAN. So that you had the entire length of that time within which to do that?

Mr. DRAKE. No; we bought an exemption, in 1880, for thirty years, from that construction. In 1880 efforts were made to build the road out, or surveys were made with a view of building the road out to deep water, by the American method of trestle works—pier trestles—but they found it difficult and expensive, and Colombia needed money then, as it does now, and we were able to purchase an exemption for 30 years, which we did; but before the expiration of the exemption we undertook, for the sake of the traffic of the railroad, to comply with our obligation and to build this pier.

The CHAIRMAN. You got an extension of thirty years?

Mr. DRAKE. Yes.

The CHAIRMAN. Within which you were not compelled to do this?

Mr. DRAKE. Yes.

The CHAIRMAN. Have you made any betterments or improvements on these islands for the railroad company?

Mr. DRAKE. No, sir; we have not been obliged to. Our terminal is at Panama, and we have made betterments in our lighterage plant—in constructing additional lighters—spending a lot of money to keep that in condition, because we found that our increasing tonnage would require both the lighterage and the pier service.

The CHAIRMAN. Do sailing ships come in there for anchorage also?

Mr. DRAKE. They can.

The CHAIRMAN. You say they can?

Mr. DRAKE. Yes.

The CHAIRMAN. But do they?

Mr. DRAKE. Not in connection with us.

The CHAIRMAN. You have no trade from the sailing ships?

Mr. DRAKE. No, sir.

The CHAIRMAN. Never have had?

Mr. DRAKE. Oh, we used to run a brig line of our own between New York and Colon. It was replaced by steam in 1871, and from that time we have operated with steamers entirely; but you understand that the Panama Railroad is an old road. It was started in 1849 and completed in 1855, and up to the time when steam became generally used on the ocean it had operated from New York by sail. In 1871 the sailing line was entirely replaced by a steam line. Since then we have not operated any sailing vessels at all, except occasionally on this side we send supplies down on sailers. We do that very frequently now.

The CHAIRMAN. Do other navigators of sailing vessels come to the railroad through the bay of Panama?

Mr. DRAKE. Oh, yes; small ones. At Panama we have four large steam lines that come regularly, but no sailing lines. All the lines that we have the traffic comes there in steam lines of the most modern type. They have large vessels of 3,000 and 4,000 tons, vessels 350 feet long, and so on.

The CHAIRMAN. What ships have the railroad company chartered, or what ships does it own, that now ply between Panama and any other ports?

Mr. DRAKE. The railroad company has always, almost uninterruptedly since 1857, had traffic agreements with other lines. In 1893 it inaugurated a line. We chartered ships directly between Panama and San Francisco in connection with our service from New York to San Francisco, which we later abandoned, and recently, in January, 1901, or in December, 1900, we inaugurated the line again, and are now operating two chartered ships, and we have had as many as four. We have now two large cargo boats operating directly between San Francisco and Panama in connection with the railroad.

The CHAIRMAN. Is your bill of lading between San Francisco and New York a through bill of lading?

Mr. DRAKE. It is a through bill of lading, issued by the Panama Railroad Company entirely.

The CHAIRMAN. By the railroad company?

Mr. DRAKE. Yes; we have a large agency in San Francisco, and our general office is in New York, and our cargo comes from interior points to New York and is sent forward on our bill of lading, and a cargo comes to San Francisco from the interior points and is sent forward on our bill of lading, issued by our agents there.

The CHAIRMAN. Your company had a traffic arrangement with the Pacific Mail on the Pacific side at one time, did it not?

Mr. DRAKE. The last renewal of the arrangement terminated December 15, 1900. There had been an interval before, from 1893 to 1895, when it was not in existence, but the last contract we had with them terminated December 15, 1900.

The CHAIRMAN. It had been renewed for what period of time?

Mr. DRAKE. It had been in operation for five years from December 16, 1895. The renewed contract expired in December, 1900.

The CHAIRMAN. What part had the transcontinental railroads in that arrangement?

Mr. DRAKE. None whatever.

The CHAIRMAN. They had a contract with the Pacific Mail, had they not?

Mr. DRAKE. Not at that time.

The CHAIRMAN. At what time did they have?

Mr. DRAKE. I understand that the contract they had with the Pacific Mail expired in 1891.

The CHAIRMAN. How long had it existed?

Mr. DRAKE. I understand it had existed before that for a period of ten or fifteen years. I have here the report of the Fellows committee on that question. Neither that contract nor any similar contract, to my knowledge, has been in existence since.

The CHAIRMAN. Since 1891?

Mr. DRAKE. Since 1891.

The CHAIRMAN. And before that it had existed for about fifteen years, you think?

Mr. DRAKE. I so understand. We were not concerned in that contract. We were not a party to the contract.

The CHAIRMAN. It was connected, though, in a business way with the contract?

Mr. DRAKE. At that time the Pacific Mail operated on the Atlantic. We had not established our line. Our contract, which had been made with the Pacific Mail in 1878, was still in force. They operated a line between New York and Colon on the Atlantic side and between Panama and San Francisco and intermediate ports on the Pacific, and under that contract we carried all of their traffic for a stipulated sum.

The CHAIRMAN. What was that sum?

Mr. DRAKE. Originally it was \$75,000, later it was reduced to \$55,000.

The CHAIRMAN. A year or a month?

Mr. DRAKE. A month.

The CHAIRMAN. Per ship?

Mr. DRAKE. No, sir; we carried all of the trade they brought to us at the terminals of the railroad. That contract and all relating to it is a matter of Congressional record.

The CHAIRMAN. Yes; I have had those contracts printed, except the contract with your company. I never got hold of that.

Mr. DRAKE. There never was any contract with our company except the old original contract of 1878. I do not know whether I have a copy of that or not, but as I said to you before, it had no reference whatever to that arrangement.

The CHAIRMAN. Your contract with the Pacific Mail, if I correctly apprehend the subject, was exclusive?

Mr. DRAKE. Oh, yes, sir; the Pacific Mail was the only line there then. It replaced our line, which had been the only line before, on the traffic to and from nondomestic ports; that is, Central America and Mexico. The contract with the Pacific Mail replaced our own line to those points and gave us direct connection with San Francisco through Panama.

The CHAIRMAN. The Pacific Mail conducted the Pacific part of the transportation and you conducted the Atlantic?

Mr. DRAKE. No; they conducted the Atlantic part also. We were like a nut in a nutcracker at that time, we were the hinge of the nutcracker.

The CHAIRMAN. They conducted it in their own ships?

Mr. DRAKE. Yes.

The CHAIRMAN. Between Colon and New York?

Mr. DRAKE. Yes. We ran them off the Atlantic in 1893.

The CHAIRMAN. You ran them off the Atlantic?

Mr. DRAKE. Yes.

The CHAIRMAN. How did you manage to do that?

Mr. DRAKE. Well, by putting on steamers of our own. We were unable to make satisfactory arrangements with them.

The CHAIRMAN. On the Atlantic side?

Mr. DRAKE. On the Atlantic side, and we put on ships of our own. We ran in opposition to them for a time, and finally, in 1895, came to an agreement with them by which the contract that expired in December, 1900, was effected, and that contract provided that we should operate on the Atlantic and they should operate on the Pacific, in connection with the railroad, we putting on our own ships on the Atlantic. We have operated them since, and we are operating them to-day.

The CHAIRMAN. You gave through bills of lading from New York?

Mr. DRAKE. Yes.

The CHAIRMAN. And they gave through bills of lading from San Francisco?

Mr. DRAKE. Yes.

The CHAIRMAN. You gave through bills of lading over their line and they give through bills of lading through your line?

Mr. DRAKE. They did up to December, 1900. We do not now. We have no arrangement with them now—have not had since December, 1900. In lieu of their service, we have two large, important, foreign lines, one the Chilean line and the other the Pacific Steam Navigation Company. We have extended their service in connection with us north to San Francisco, and our service covers the coastwise traffic direct from Panama to San Francisco.

The CHAIRMAN. And has all the time covered the coastwise traffic, has it not?

Mr. DRAKE. Yes.

The CHAIRMAN. The United States coastwise traffic?

Mr. DRAKE. Yes; what the Treasury Department designates as the coastwise traffic.

The CHAIRMAN. What arrangement have you with these two other lines you have mentioned?

Mr. DRAKE. A regular traffic agreement made in printed form, giving them the privilege, not exclusively, a nonexclusive privilege, of a connection with us at Panama, to transport to and from foreign points on the Pacific coast, traffic with New York or to Europe, in connection with the foreign lines named in the contract. We have seven important lines that connect with us at Colon from Europe—the Royal Mail Steam Packet Company from South America; the Hamburg American Line from Hamburg; the Compagnie Generale Transatlantique from Havre; Frederick Leyland & Co., West India and Pacific branch, from Liverpool; the Harrison Line, also from Liverpool; the Companie Transatlantica from Barcelona; La Veloce Navigazione from Genoa. The copy you have there is with the Pacific Steam Navigation Company, I think. This one which I have here is with the Chilean line. They are all the same.

The CHAIRMAN. They are the same, all these traffic arrangements?

Mr. DRAKE. Yes; there are some little variations which are not important, though.

The CHAIRMAN. I have not seen this before. I suppose it will go in the record.

The agreement referred to is as follows:

THE PANAMA ROUTE.

Agreement made this 20th day of March, 1901, between the Panama Railroad Company, of New York, in the United States of America, of the first part, and the Compania Sud Americana de Vapores, of Valparaiso, Chile, of the second part, to become operative at the expiration of the existing agreement between the parties on June 16th, 1901, or earlier, at the option of the Cia. Sud Americana de Vapores, upon notification to that effect to the Panama Railroad Company.

ARTICLE I.

SEC. 1. The parties hereto do mutually agree to cooperate in the carriage, transportation, landing, and delivery of passengers, mails,

and cargo between ports served on the Pacific coast of North, Central, and South America and ports on the Atlantic Ocean and elsewhere served by the several steamship lines now running to Colon, and which may be augmented by additional companies, at the option of the Panama Railroad Company, the Panama Railroad Company being responsible for all freights and fares due by any such additional company or companies until the second party to this contract shall signify its acceptance of such cocarriers, viz:

The Royal Mail Steam Packet Company.

The Hamburg-American Line.

The Compagnie Generale Transatlantique.

Fred'k Leyland & Co. (1900) West-India and Pacific Branch.

The Harrison Line.

The Compania Transatlantica (Barcelona)

La Veloce Navigazione.

The Panama Railroad Company's Line.

SEC. 2. It is agreed and declared that the provisions of this agreement do not in any way interfere with the prerogative of the Panama Railroad Company to make an agreement or agreements on the same conditions and stipulations (except as to frequency of service) as those herein stated with any other steamship line or lines which the Panama Railroad Company may decide to admit as cocarriers on the Pacific Ocean. And the party of the second part agrees to deliver at Panama, and convey from Panama, all cargo, etc., applicable to their steamers, in connection with any steamship line or lines now serving Colon, or which the Panama Railroad Company may appoint as its cocarriers on the Atlantic side of the Isthmus of Panama, as per section 1; but the Panama Railroad Company undertakes during the continuance of this contract to give to the party of the second part the treatment accorded among nations by the "most-favored-nation clause," and to make it an essential and sine qua non condition, when granting a working agreement to any other steamship line or lines now serving, or which may serve, Panama, that said steamship line or lines will accept, and be made to accept, the entirety of the conditional clauses stipulated in the present contract.

ARTICLE II.

The Cia. Sud Americana de Vapores agrees that all traffic with Europe and the east coast of North America and the West Indies to and from ports between and including Guayaquil and San Francisco now served by it shall be transported by the Isthmus route, and that no part of such traffic of the Cia. Sud Americana de Vapores shall be diverted to or transported by any other route.

It is understood and agreed that traffic to and from ports south of Guayaquil, which it has been customary for the party of the second part to send via the Isthmus, shall not be diverted from that route by the party of the second part.

ARTICLE III.

SEC. 1. The term "cargo" for the purpose of this agreement shall mean any description of cargo, merchandise, specie, jewelry, quick-silver, parcels, and animals.

SEC. 2. Through passage tickets, bills of lading, and receipts for

parcels to be granted in the forms now in use, with such modifications as the Panama Railroad Company shall find necessary to introduce in them, not prejudicial to the interests of the Cia. Sud Americana de Vapores, or which may be made by mutual consent.

SEC. 3. The proportion of the through freights accruing to the Cia. Sud Americana de Vapores shall be:

33½ per cent between Europe and ports south of Panama and those north of Panama to Ocos (inclusive).

37½ per cent between Europe and ports in Mexico.

40 per cent between Europe and San Francisco.

45 per cent between West Indies and all ports enumerated in the above, on the Pacific.

38 per cent between New York and ports south of Panama.

33½ per cent between New York and ports north of Panama to Ocos (inclusive).

37½ per cent between New York and ports in Mexico.

SEC. 4. Rates of freight are to be fixed by the initial carriers on both sides of the Isthmus, subject to the right of revision by the Panama Railroad Company, to the end that one carrier may not maintain reduced rates in connection with the railroad in competition with another carrier also connecting with the railroad.

The rates are to be competitive as against other routes down to a minimum of 35s. per ton, except Colombian produce, which is subject to special conditions.

SEC. 5. Each of the parties hereto shall be at liberty to fix such passage rates by its ships or by its railroad as it may from time to time think fit. Through rates shall be the sum of the respective rates in force for the time being, it being agreed that any reduction which it may be found necessary to make to meet competition shall be borne pro rata; such reductions may be made by the initial carrier without consultation with the others so long as the minimum rates fixed by the several carriers are secured.

SEC. 6. Charges for excess baggage are:

Between Panama and Colon, 3 cents per lb.

From New York to ports south of Panama, 5 cents per lb. Divided: Panama Railroad Co., 4 cents; C. S. A. de V., 1 cent.

From New York to Central America and Mexico, 6 cents per lb. Divided: Panama Railroad Co., 4 cents; C. S. A. de V., 2 cents.

From all Pacific ports to New York, 6s. or \$1.50 per cubic foot. Divided: C. S. A. de V., 2s. 6d.; Panama Railroad Co., 3s. 6d.

SEC. 7. Employees of either of the contracting companies carried under this agreement by the other shall be entitled to reduction of 33½ per cent on the published tariff.

SEC. 8. Each party shall be responsible for cargo while under its care and until delivery to its co-carrier. Any responsibility accruing in regard to passengers or their baggage to be assumed in like manner with cargo.

SEC. 9. In case any actions, suits, or claims shall be brought against any co-carrier, the carrier responsible as above stipulated shall bear and discharge any loss, damage, or expense incident thereto; provided the carrier sued shall at once give notice to the other co-carrier, to the end that each may have opportunity to defend its interests.

SEC. 10. The whole of the freight (except that which may be exceptionally "prepaid" homeward or "collect" outward freight) pay-

able under this agreement shall be collected by the steamship line forming the connection at Colon, such line being accountable to the parties to this agreement for their respective proportions thereof every month. "Prepaid" homeward and "collect" outward freight shall be collected by the party of the second part, and the latter shall be accountable every month to the party of the first part and to the steamship line forming the connection at Colon for their respective proportions.

SEC. 11. The steamers of the Cia. Sud Americana de Vapores shall make use of the La Boca wharf provided by the Panama Railroad Company whenever in the judgment of the Cia. Sud Americana de Vapores it is safe and prudent so to do; but in the event of the steamers not being able to get alongside said wharf without delay, then the cargo, etc., shall be lightered in the Bay of Panama. Cargo to be received and delivered at either the La Boca, American, or English wharf, whether steamers come alongside or not. If the steamers come to La Boca wharf, cargo to be delivered to and taken away from alongside the steamers as fast as they can deliver or receive same, in order that the steamers shall not be delayed, the Panama Railroad Co. undertaking to furnish all facilities necessary for prompt unloading and loading of steamers.

Local cargo to be received and delivered by the party of the first part as agent for the party of the second part, in the city of Panama; transfer to and from steamer, including lighterage and [or] wharfage, to be furnished by party of the first part, and party of the second part will pay \$1.50 per ton for such services rendered.

SEC. 12. The party of the second part agrees to pay lighterage and wharfage rates at Panama out of its proportion as follows:

When lightered by the Panama Railroad Company at the request of the Cia. Sud Americana de Vapores:

4s. or \$1.00 per ton when the through rates of freight per ton do not exceed \$10.00 between New York and Pacific ports, both ways; 50s. from Europe to Pacific ports; 45s. from Pacific ports to Europe.

5s. or \$1.25 per ton when the through rates per ton exceed the above figures.

Specie, treasure, and ad valorem rates, one-fortieth of 1 per cent.

Passengers, each \$1.00.

Mails, per ton of 2,240 lbs., \$1.25.

Extra baggage, per ton, \$1.25.

By reason of the delay which would be caused by attempting to correctly differentiate the rate of lighterage due at the time the service is performed, it is mutually agreed that a rate of \$1.00 U. S. gold per ton shall be charged and collected at the time of service; the additional 25 cents U. S. gold per ton upon such cargo as may prove entitled thereto to be paid as soon as such amounts are ascertained.

All payments for lighterage to be made by the party of the second part by sight drafts of the Panama agency upon the New York agency, which drafts are to be settled in the monthly accounts of the party of the first part.

When rates are made \$7.50 or less per ton, 50 cents per ton of the lighterage charge is to be deducted before pro-rating, for rebate to the lighterer, if the Atlantic lines concur.

The Panama Railroad Company not to make any charge for light-

erage in the case of steamers discharging at La Boca when same is necessary.

When steamers load and [or] discharge alongside La Boca wharf, no charge shall be made on passengers, mails, specie, etc., but the Panama Railroad Company shall be paid as wharfage on all through cargo (when same is taken from or landed on the wharf direct) the equivalent in American currency of 2s. 6d. or say 60 cents per ton, this charge to be tentative only until justifiable permanent rates shall be agreed upon when experience has been obtained from the working of the wharf for an experimental period not exceeding six months; and (ten) 10 cents per ton on cargo for the use of cranes, such usage of cranes being optional. When lighterage is performed by the Panama Railroad Company no charge is to be made for the use of the wharf or cranes.

All settlements for wharfage to be made in the manner described above for settlements of lighterage.

The term "ton" is understood to mean 40 cubic feet, 2,000 lbs. or 2,240 lbs. as per bill of lading.

SEC. 13. The divisions and other conditions of this article may be altered by mutual consent without affecting any of the other stipulations contained herein.

SEC. 14. The Panama Railroad Company to provide at its wharf at La Boca the necessary equipment for the efficient operation thereof.

SEC. 15. Outward cargo is to be forwarded promptly from Colon to go forward by first connecting steamer after its arrival at Panama. The Cia. Sud Americana de Vapores undertakes to provide sufficient tonnage so as to be able to receive cargo on board its steamers with all possible dispatch, but in the event of its first connecting steamer not accepting delivery, the Panama Railroad Company shall have the option of forwarding cargo by the next departing steamer of either the Cia. Sud Americana de Vapores or the Pacific Steam Navigation Company.

SEC. 16. As respecting mails, the Panama Railroad Company will receive its instructions direct from the agent of the party of the second part as to when mails are to be landed or embarked. Local mails are to be landed immediately on the arrival of the steamer, tide suitable or not, and on the reef as hitherto when necessary. Expenses of transporting mails after landing to be paid by the steamship company concerned.

SEC. 17. The Panama Railroad Company to advise promptly, free of charge, by wire or telephone, the agent of the Cia. Sud Americana de Vapores of the arrival of the steamers at Colon, giving information respecting mails, passengers, specie, cargo, etc., and destination.

SEC. 18. The Panama agent of the Cia. Sud Americana de Vapores to advise promptly the superintendent of the railroad company free of charge of the departure of steamers from the last port of call, giving information respecting mails, passengers, specie, cargo, etc., and destination.

ARTICLE IV.

Any and all questions that shall or may arise touching this agreement or the construction thereof, or as to any other matters and things to be done or performed by either of the parties hereto, as to which the parties hereto can not agree, shall be terminated through the decision and award of two arbitrators, one to be chosen by each of the

parties, who shall be disinterested persons resident in New York or on the Isthmus of Panama. In case said arbitrators shall be unable to agree, they may choose a third arbitrator, and the decision of any two of such arbitrators shall be final. All hearings by such arbitrators shall be held in New York or on the Isthmus of Panama. Arbitration of the Isthmus is to be confined to local matters that need immediate decision.

ARTICLE V.

The Panama Railroad Company agrees to transport coal and other supplies for the Cia. Sud Americana de Vapores at the following rates, viz.:

By each of its steamers from New York to Colon, supplies, other than coal, exclusively for the use of the Cia. Sud Americana de Vapores, at the rate of \$5.00 per ton, from Colon to Panama (for haulage) at \$3.00 per ton, and to lighter same at \$1.00 per ton additional.

For coal from Colon into lighters at Panama wharves, including all charges for loading, etc., at Colon. \$4.00 per ton. For coal from Colon to alongside steamers in the Bay of Panama, \$5.00 per ton.

ARTICLE VI.

This agreement shall continue in force until terminated by either of the parties hereto giving to the other ninety days' previous notice in writing of its intention to determine the same, provided that such notice shall not be given before the lapse of nine calendar months, and only between the first of January and the first of July in any year.

New York, June 7th, 1901.

PANAMA RAILROAD COMPANY,
E. A. DRAKE,
2d Vice-Pres. and Sec'y.

By cable authority dated Paris, June 6th, 1901.

CIA. SUD AMERICANA DE VAPORES,
JOHN R. LIVERMORE, *Agent.*

The CHAIRMAN. I do not fully understand the purpose of the railroad company in making this traffic agreement, or the advantages that the company will have in entering into these several agreements that you have mentioned. I should be very glad if you will explain what the advantage is to the railroad company.

Mr. DRAKE. Yes; the railroad company is a company organized under the laws of the State of New York, chartered in 1849, and it operates a railroad primarily across the Isthmus of Panama under a concession from the Government of Colombia. Its charter gave it the right to operate such steamship lines as might be necessary and convenient.

The CHAIRMAN. The charter gives that right?

Mr. DRAKE. The charter gives that right specifically of purchasing and navigating such steam or sailing vessels as may be proper or convenient to be used in connection with the said road. The railroad never thought it necessary, and it certainly was not convenient, to establish lines for connection with all these points, when it could make traffic agreements with mail lines running from all these points, bringing

freight from a distance to the Isthmus itself, these lines being under postal contracts with their own governments to our ports. So we made arrangements, so that there might not be competition between those companies as to serious cutting of rates, so that each one might protect and develop the traffic to the greatest extent. So we have entered into traffic arrangements with them, which have lasted for something over fifty years in some cases, by which they take all the freight that is offered at their home ports for the points beyond the Isthmus, and bring it to us for transportation under through bills of lading, under through rates, which are divided proportionately by agreement between the carriers, the railroad company of course getting all that it can out of these through rates, making a *del credere* allowance to the final carrier for expenses of collection, and so forth.

The same is true in the reverse direction, on the Pacific coast. These two lines take freight to carry forward and forward the freight that has been brought to us on the Atlantic side by these Atlantic steamship lines; take it from us at Panama and carry it forward to destination, deliver it, and make the proper collection, adjust claims, and remit to us the proportion due to us.

If it were not for these connecting lines the traffic of the Isthmus would, of course, be very materially reduced. If the railroad company attempted to handle all the freight that is brought to us in vessels of its own from these various ports and undertook the forwarding by vessels of its own to ports of destination, instead of forwarding by connecting lines, the company would need an enormous capital—an amount sufficient to enable it to own and operate all these lines—and it could not begin to operate them as well as the different nationalities operate their own lines.

The CHAIRMAN. If I understand you, these contracts are alone with companies that are subsidized by foreign nations or by the United States as mail lines?

Mr. DRAKE. Several have postal contracts. I do not know the character of them. I have here a diagram which shows the connecting lines. That is our regular folder. That shows the number of lines, and our own line is indicated by the heavy red mark. This other tracing which I have here I will be happy to replace for you if you desire it. That is one of my original documents.

The CHAIRMAN. I do not think I have any use for that, for I am not going into the refinements of engineering on this question. I am pursuing this examination on broad lines. You say all of these lines have postal contracts?

Mr. DRAKE. I know that some of them have.

The CHAIRMAN. You mentioned the fact.

Mr. DRAKE. Yes; I know, for instance, that the Royal Mail Line are under a contract with their Government, and I know that the French line have a contract with their Government.

The CHAIRMAN. Has your railroad company any postal contracts with the United States?

Mr. DRAKE. No, sir. We receive ordinary postal compensation for the transportation of the mails by our steamers from New York to Colon and a separate compensation for the transportation across the Isthmus. That is regularly settled, as with all other carriers, but we have no contract.

The CHAIRMAN. And up the coast on the other side also?

Mr. DRAKE. We have nothing to do with that. We do not carry the mails there. We have only cargo boats there.

The CHAIRMAN. Who carries the mails?

Mr. DRAKE. Most of the mails go by the transcontinental railroad.

The CHAIRMAN. But there is some mail goes up the coast?

Mr. DRAKE. Yes; by first departure of connecting steamship lines for Central America or Mexico.

Mr. PAINE. Our boats do not stop at points along the coast?

Mr. DRAKE. The company's steamers on that side are slow freight steamers. The foreign mail is carried by the foreign lines on the other side. The mail is delivered at Panama to the official known as the British postal agent, by whom it is distributed to the foreign lines whose home governments are in the International Postal Union.

The CHAIRMAN. You pay no attention to the intermediate ports between Panama and San Francisco.

Mr. DRAKE. No. Under the old contract which we had with the Pacific Mail Steamship Company the Pacific Mail covered all of those ports in connection with us. After the contract with the Pacific Mail Steamship Company was terminated we established a freight line between Panama and San Francisco direct, and to preserve our connection with the foreign intermediate ports, which is an important factor in our business, we entered into these contracts with the two lines which had theretofore served us only south of Panama. In other words, our service is to San Francisco and their service is to the intermediate foreign ports, and this combined service replaces the service which was formerly carried by the Pacific Mail, so that we lost none of our business by the rupture with the Pacific Mail.

The CHAIRMAN. I understand that these traffic agreements had reference to the concentration of traffic across the Isthmus.

Mr. DRAKE. There is a large normal traffic that finds an outlet across the Isthmus, and we have sought to develop it, and we are increasing it all the time.

The CHAIRMAN. And to draw to the railroad traffic from other quarters?

Mr. DRAKE. Yes.

The CHAIRMAN. And to overcome competition?

Mr. DRAKE. There is no competition between those ports except via Magellan. There is what is known as the Kosmos Line and the Pacific Steam, one of our cocarriers; the Compagnie Maritime du Havre, and one or two other lines that I do not recall, that operated around the Horn from Europe. Then there is the Grace Line, or what is known as the Merchants' Line from New York, that operates around the Horn to points up to Guayaquil. The Kosmos Line, which operates from Europe exclusively runs up as far as San Francisco.

The CHAIRMAN. Some of those lines do not run farther than to Valparaiso, do they?

Mr. DRAKE. All of them run as far north as Guayaquil. Three of them run up to San Francisco.

The CHAIRMAN. Is there any competition that you are seeking to overcome that goes around the Cape of Good Hope?

Mr. DRAKE. No, sir. It has been talked of recently as a possibility that business to the Orient, as we call it, might be developed via the Isthmus, which goes now from the Southern States via Suez. It would seem that that business, normally, ought to find an outlet

through the canal when it is constructed, but we have never yet been able to establish a route that would compete with that traffic.

The CHAIRMAN. That would compete with the Suez?

Mr. DRAKE. That would compete with the Suez.

The CHAIRMAN. Have you established a route that will compete with ships of any sort, sailing ships or steamships, around the Cape of Good Hope?

Mr. DRAKE. Not yet.

The CHAIRMAN. Have not?

Mr. DRAKE. No, sir; they make a very low rate there. The rate from here to Honolulu, or from here to the Philippines, or to China, on certain classes of goods, coming from the Southern States mostly, cotton goods, structural iron, etc., on those the rate is so low by the direct service via Suez, now, to establish competition.

The CHAIRMAN. It is still lower by sailing ships around the Cape of Good Hope, is it not?

Mr. DRAKE. I am speaking of that route.

The CHAIRMAN. You said Suez.

Mr. DRAKE. Well, I am speaking of those collectively; the rates to those points via either one of those routes.

The CHAIRMAN. Around the Cape of Good Hope or through the Suez Canal?

Mr. DRAKE. Yes.

The CHAIRMAN. You put them on the same basis?

Mr. DRAKE. In the same category as to through rates. There is a differential between the two, but we can not compete with it; at least have not been able to do so yet.

The CHAIRMAN. But the competition you have established by your traffic arrangement does not contemplate that business at all?

Mr. DRAKE. It relates entirely to the Horn, except our service to San Francisco, and that relates to competition with the Transcontinental Railroad.

The CHAIRMAN. Have these traffic arrangements very largely added to the tonnage of freight across the Isthmus by the railroad?

Mr. DRAKE. The tonnage is an increasing one all the time.

The CHAIRMAN. Regularly increasing?

Mr. DRAKE. It may be only normal, but it is regularly increasing.

The CHAIRMAN. So that your company is doing better now than it has formerly?

Mr. DRAKE. Doing as well as ever; of course, not doing as well as during the canal-construction times, but it is doing as well as it has done for the last eight or nine years. The average net earnings have been \$800,000 a year.

The CHAIRMAN. Then you have no particular interest in seeing it supplanted by a canal, have you?

Mr. DRAKE. We are a railroad pure and simple. We are interested in the railroad and in its development as it stands to-day. We make great claims for it. I think very little is known, and certainly not much is appreciated, as to the development and as to the possibilities of the railroad. It is in splendid condition. It is unique. It owes no money. It runs through a semicivilized territory. We have all of the *modus operandi* of the most modern railroads; and thanks to Mr. Paine's skill and ability, we have all our work done up to standard. Everything about the road, our replacements, our construction of buildings,

our construction of bridges, are all of the most modern character. We have sections of our road that will compare with the Pennsylvania Railroad. We are proud of it.

The CHAIRMAN. You say you are proud of it?

Mr. DRAKE. We are proud of it, sir; because all of that work is done far from home, and it shows that we have a very intelligent and competent staff.

The CHAIRMAN. I think it is wonderful that it should be.

Mr. DRAKE. We have a gold pay roll and a silver pay roll. The gold pay roll represents the employees who are selected here and sent down there, who reside there, with their families, in the company's quarters. And I should like to say, and I should like to have it recorded, that, although much is said of the nonsalubrity of the Isthmus, during the last five years we have had among that colony of our employees, among those whom we sent there, but twelve deaths.

The CHAIRMAN. Twelve deaths among your employees?

Mr. DRAKE. Among our employees sent from the United States. We have a total of gold pay-roll employees sent from here and on the Isthmus of 338.

Mr. PAINE. Those are on the gold pay roll?

The CHAIRMAN. And how about the silver pay roll?

Mr. DRAKE. The silver pay roll represents the natives. There are 338 on the gold pay roll, and among them we have had 12 deaths in the last five years, and only part of these due to climatic causes.

The CHAIRMAN. How about the silver pay roll?

Mr. DRAKE. The silver pay roll is made up of natives. There are 1,387 of them. It is made up of Jamaicans and of people who live in the Tropics, and very naturally are exempt from diseases due to the climate.

The CHAIRMAN. What is the proportion of death among them?

Mr. DRAKE. We have not that record. That is not furnished to us.

Mr. PAINE. There have been no epidemics since I have been there.

Mr. DRAKE. I have been connected with the railroad for fourteen years, and during that time we have had no epidemics.

The CHAIRMAN. You have kept no record of deaths on the silver pay roll?

Mr. DRAKE. The silver roll are natives. It would be keeping the statistics of the towns there. It is easy to obtain; but they live there. We employ them and discharge them, and there is a constant coming and going.

The CHAIRMAN. In other words, it is day labor.

Mr. DRAKE. That is all; it is either monthly or day labor.

The CHAIRMAN. And the other is salaried labor?

Mr. DRAKE. Yes, regular labor.

The CHAIRMAN. Now, how much has the canal company proper, the present Panama Canal Company, at any time contributed out of its resources, if anything, to the improvement or the betterment of the railroad there as to building, or maintenance, or equipment?

Mr. DRAKE. Never one dollar, sir, except as contractors.

The CHAIRMAN. Except as a contractor?

Mr. DRAKE. Except as contractors doing work for us for which we paid, or the obtaining of advantages or benefits for which they have paid, they never have contributed anything.

The CHAIRMAN. They have been liberal in their dealings with you, have they not?

Mr. DRAKE. They have not been liberal. Our relations are more tense, probably, than with any others. What I mean by that is that we are as exacting, or more so, with them than we would be with others in all our contracts. The autonomy of the railroad is absolutely preserved. That is one of our principal plans. Every dollar of work that they do for us we pay them for; every particle of material or labor that they contribute we pay for; and we exact the same in return. Everything is done by contract, duly ratified by the members of the different companies, and lived up to exactly.

The CHAIRMAN. You mentioned the fact that your company was out of debt?

Mr. DRAKE. Entirely, sir. Practically, I am perfectly correct in that, but there is a matter on which the last payment is yet to be made. When the pier was constructed the canal company did it under a contract by which they furnished the labor and the plant to the extent of \$1,000,000, and we had five years in which to pay that. At the time that contract was made we were engaged in active competition, and we wanted to develop our facilities. We did not want to spend \$1,000,000 at that time. We made this contract by which we had five years in which to pay that million dollars, but we have made various payments on account, as the contract allowed us to do, since that time, and have just made an arrangement to extinguish the debt. Only a day or two ago we made a payment of \$500,000, and we are going to pay the balance in a few days.

The CHAIRMAN. You have a bonded debt, have you not?

Mr. DRAKE. Yes; we have a first-mortgage $4\frac{1}{2}$ per cent sinking-fund gold bond at an authorized issue of four thousand bonds, or \$4,000,000, but of that at present there are only \$1,504,000 in the hands of the public. We are just arranging for the use of \$1,000,000 of balance for the extinguishment of the debt to the canal company, so that now there will be \$2,504,000 of bonds outstanding in the hands of the public, and we will have no floating debt of any kind.

The CHAIRMAN. Does that represent the entire bonded indebtedness?

Mr. DRAKE. It does.

The CHAIRMAN. The round sum you have mentioned?

Mr. DRAKE. The round sum of the indebtedness. The authorized issue of the bonds is \$4,000,000. Of that \$4,000,000, there are \$2,504,000 outstanding. The balance is in the company's treasury. May I say, sir, that that indebtedness is reduced every year by a sinking fund, by an application of \$150,000 a year to the sinking fund?

The CHAIRMAN. What amount of sinking fund have you got?

Mr. DRAKE. In the company's voluntary sinking fund we have \$310,000 on deposit with the United States Trust Company. The company's cash assets to-day are \$490,000, of which \$300,000 are the company's voluntary sinking fund, applied to setting aside a fund to meet the indemnity of the Republic of Colombia, the interest on its bonds.

The CHAIRMAN. By voluntary sinking fund what do you mean?

Mr. DRAKE. I mean we are not obliged to do that. That is done in the ordinary course of our business as a precaution. The redemption clause of our mortgage requires that on the 1st of August of each year we should pay in \$150,000 to the sinking fund.

The CHAIRMAN. How much is there of that redemption fund?

Mr. DRAKE. The monthly proportion since the 1st of October, for the months of October, November, December, January, and February.

There are six-twelfths of the amount set aside to meet the full amount of \$150,000, which becomes due in August.

The CHAIRMAN. That is all?

Mr. DRAKE. Yes.

The CHAIRMAN. You do not keep any permanent sinking fund?

Mr. DRAKE. No, sir; but applied from time to time.

The CHAIRMAN. So the company has no indebtedness other than what you have stated?

Mr. DRAKE. No, sir. There is an indemnity that we pay to the Republic of Colombia of \$250,000 a year. They capitalized that with bankers, and they reserved in their concession with us the right at any time to hypothecate that, and to secure the cooperation of the road in doing it.

The CHAIRMAN. In other words, they got into financial trouble and wanted to realize upon this \$250,000 a year?

Mr. DRAKE. Yes; but they have only capitalized \$225,000 of it, because \$25,000 goes to the State of Panama, is paid by us directly to the State of Panama, so that that debt is anticipated and provided for in this capitalization.

The CHAIRMAN. Up to what time?

Mr. DRAKE. For thirty years, up to 1908.

The CHAIRMAN. At that time you resume the payment of the \$225,000 per annum?

Mr. DRAKE. Yes.

The CHAIRMAN. To the Colombian Government?

Mr. DRAKE. Yes.

The CHAIRMAN. And how much to the State of Panama?

Mr. DRAKE. Twenty-five thousand dollars a year.

The CHAIRMAN. In addition?

Mr. DRAKE. Yes; that makes a total of \$250,000.

The CHAIRMAN. Is that arrangement with the State of Panama or with the Government of Colombia?

Mr. DRAKE. The contract originally was made with the Republic of New Granada. The concession was granted originally by the Republic of New Granada. Afterwards the Republic of Colombia was established, and the State of Panama became one of the States in that aggregation, and in their concession to us they set aside \$25,000 a year to be paid to the State of Panama.

The CHAIRMAN. That payment of \$25,000 a year is made under that concession?

Mr. DRAKE. Yes.

The CHAIRMAN. That has not been capitalized or anticipated in any way?

Mr. DRAKE. No, sir; not but what they have endeavored to do it.

The CHAIRMAN. But the railroad company pays that \$25,000 a year regularly to the State of Panama?

Mr. DRAKE. Yes.

The CHAIRMAN. And not to the Republic of Colombia?

Mr. DRAKE. It is to the department of Panama.

The CHAIRMAN. There has been some change in the characteristics of the Government down there, I believe?

Mr. DRAKE. Yes.

The CHAIRMAN. So that the State of Panama has settled down to the quality of a department?

Mr. DRAKE. Yes, the Republic is divided into departments, and the

Government, during the existence of martial law, are given arbitrary power, and they are exercising it too, incidentally.

The CHAIRMAN. The existence of martial law is the rule instead of the exception, is it not?

Mr. DRAKE. It has been recently, for the past two or three years. Prior to that we had no trouble. There is a state of revolution there. I have never known martial law before, but since July, 1900, it has existed.

The CHAIRMAN. While I am on that point—I have no doubt you are familiar with the history of the matter—how many interventions have the Government of the United States made down there with force, to rectify things, and sent ships there to support our authority?

Mr. DRAKE. Three times since 1885.

The CHAIRMAN. This present one is the fourth?

Mr. DRAKE. This is the third. I regard this as a continuing one, since July last. It is still in effect.

The CHAIRMAN. This is the third, not the fourth?

Mr. DRAKE. This is the third, if my recollection serves me. I do not want to misstate the facts.

The CHAIRMAN. That was all occasioned by the insurrectionary or turbulent conduct of the people there, was it not?

Mr. DRAKE. Yes; a revolutionary state on the Isthmus.

The CHAIRMAN. Right there in the State of Panama?

Mr. DRAKE. No, not actively. In July last there was a battle on the outskirts of the city of Panama. They came up to the bridge of the railroad. The revolution has been hovering around, but owing to the certainty of our protection our property has not been materially injured.

Mr. PAINE. It was a year ago last July instead of last July.

The CHAIRMAN. These outbreaks have not been local quarrels between the people?

Mr. DRAKE. Not at all. There are two parties there.

The CHAIRMAN. It has been a political demonstration?

Mr. DRAKE. Yes; there is the clerical party and the liberal party there, and each struggles for the supremacy.

The CHAIRMAN. Will make a pronunciamiento and go to fight?

Mr. DRAKE. No; we regard it as a state of revolution there. There is a liberal party seeking to get control of the Government. They are actively carrying on operations in the different States. For instance, they recently attacked Tumaco, and they have recently attacked Honda. They have had a battle in the vicinity of Carthagena, and recently there were skirmishes on the line of the road, which were interrupted by the action of our Government.

The CHAIRMAN. How many directors have the Panama Canal Company in the Panama Railroad Company?

Mr. DRAKE. Mr. Hutin, president of the Panama Canal Company, is one of our directors for the last year. He is the only one.

The CHAIRMAN. The Panama Canal Company have the control of it if they choose to exercise it?

Mr. DRAKE. No, sir; no more than any other stockholder would have. They have the control by owning a majority of the stock. They have the selection of the directors at the annual meeting, but during the intervening time they have no more to do with the railroad than you have.

The CHAIRMAN. But in the selection of directors they have the absolute power, if they choose to exercise it?

Mr. DRAKE. By owning a majority of the stock; yes.

The CHAIRMAN. So that if they do not choose the board of directors, of course it is forbearance on their part, or policy?

Mr. DRAKE. If they did not do it, other stockholders would.

The CHAIRMAN. Would what?

Mr. DRAKE. Would nominate and elect the directors. It is by their preponderance of voting that they elect their candidates.

The CHAIRMAN. Since Monsieur Hutin's resignation as president of the Panama Canal Company, has he ceased to be a director in the railroad company?

Mr. DRAKE. Not of record, sir; but he probably will at the next election. He has not resigned from the directorate of the railroad yet. His resignation was tendered, I believe, but has not yet reached us.

The CHAIRMAN. Monsieur Bo is not a director?

Mr. DRAKE. No, sir; not at all.

The CHAIRMAN. Since you have been connected with this company, or rather since concessions made from Colombia to the Panama Canal Company, has not that company been continually represented in the board of directors of the Panama Railroad Company by its present president or someone as a director?

Mr. DRAKE. They have elected the boards of directors every year since they acquired a majority of the stock. I do not think they have ever been outvoted.

The CHAIRMAN. And they have always had a representative who was connected also with the Panama Canal Company, have they not?

There is a Mr. Xavier Boyard, who is associated with the canal company.

Mr. DRAKE. He is one of our directors.

The CHAIRMAN. And Mr. Cromwell?

Mr. DRAKE. Mr. Cromwell is one of the largest minority stockholders. He is elected in that capacity.

The CHAIRMAN. He is the attorney and counsel of the Panama Canal Company in the United States?

Mr. DRAKE. Yes; sir.

The CHAIRMAN. He is officially connected with them in that way?

Mr. DRAKE. Yes.

The CHAIRMAN. And has been for a long time?

Mr. DRAKE. Yes.

Senator KITTREDGE. Who are the stockholders outside, in addition to the Panama Canal Company?

Mr. DRAKE. There are 39 stockholders in the United States. The list of the stockholders is filed with the Isthmian Canal Commission. I apologize for not bringing it here. I had no idea it would be required, but there are 39 stockholders in the United States and 17 in France and England, in addition to the holdings of the canal company.

Senator KITTREDGE. You say Mr. Cromwell is a stockholder?

Mr. DRAKE. Yes.

Senator KITTREDGE. The list you mention will give his holdings?

Mr. DRAKE. Yes.

Senator KITTREDGE. And those of the others?

Mr. DRAKE. Yes. I can supply that if it is required.

Senator KITTREDGE. I wish you would.

Mr. DRAKE. It is of record with the Commission, but I will furnish it.

List of stockholders of Panama Railroad Company.

Name.	Address.	Number of shares.
Boyard, Xavier	24 State street, New York	1
Brown, Vernon H	29 Broadway, New York	1
Cahen, Rudolph T., Marquis de Torre Alfina	26 Exchange place, New York, care of L. Von Hoffman & Co.	10
Cahen, Ugo	do	10
Chesebrough, Robert A	17 State street, New York	1
Comstock, C. B	34 West Twenty-fifth street, New York	1
Coudert, Chas	71 Broadway, New York	1
Cromwell, Wm. Nelson	49 Wall street, New York	31
D'Anvers, Albert Cahen	26 Exchange place, New York, care of L. Von Hoffman & Co.	20
D'Anvers, Louis Cahen	do	20
D'Espeyran, Felix Guillaume Sabatier	9 Rond Point des Champs Elysees, Paris, France.	28
D'Espeyran, Mme. L. C. C. de Barrois d'Orgeval Sabatier.	do	24
De Lesser, A. L. F. B. C	Care Mallet Freres & Co., Paris	23
De Lesser, A. R. A. C	do	23
Dinamore, W. B	59 Broadway, New York	1
Drake, E. A	24 State street, New York	1
Einsiedler, Charles	27 Williams street, New York	1
Escott, Rev. Edward Sweet, and Cox, Henry Fisher.	The Red Cottage, Lyme Regis, England	37
Felton, Samuel F	Monadnock Building, Chicago, Ill	1
Franklin, Wm. B	Hartford, Conn	1
Gallaway, Robert M	42 Wall street, New York	1
Garr, George	14 West Forty-fifth street, New York	1
Gates, I. E	35 Wall street, New York	100
Gautron, Jean Pierre, liquidatuer	Paris, France	68,534
Gebhard, Wm. H	New York, N. Y	10
Gordon, Jas. R	112 Wall street, care of Czarnikow, McDougall & Co.	70
Haines, Augustus Montague	45 Wall street, New York, care of J. Kennedy Tod & Co.	18
Hopkins, A. Lawrence	Williamstown, Mass	1
Hutin, Maurice	Paris, France	12
Hudson, Woodward	Boston, Mass	5
Hurtado, Mercedes	19 Whitehall street, New York, care of Hurtado & Co., in liquidation.	2
James, Angelina Henrietta	99 Grove Lane, Denmark Hill, London, England.	59
Jennings, F. B	15 Broad street, New York	3
Lampre, Edouard	Paris, France	341
Leverich, C. D., & Bro	48 Wall street, New York	13
Mackay, Mary C	6 Wallstreet, New York, care of A. K. Mackey.	5
Maddock, Henry	21 Barclay street, New York	1
Manning, John B	2 Wall street, New York	233
Manning, Mary	do	10
Mills, D. O	15 Broad street, New York	1
Montefiore, Madam E. L	26 Exchange place, New York, care of L. Von Hoffman & Co.	18
Motley, J. M	12 John street, New York	5
Murray, William	112 Wall street, New York, care of Czarnikow, McDougall & Co.	15
McCullough, John G	21 Cortland street, New York	3
Newton, Anna M	24 State street, New York	1
Oppenheim, Ernest L	Johnston Building, New York, N. Y	150
Oppenheim, Edward L	do	10
Palmedo, U	26 Exchange place, New York, care of L. Von Hoffman & Co.	10
Park, T. L	345 Broadway, New York	3
Parker, J. H	Cotton Exchange Building, New York	1
Pegler, Stephen Francis and Francis	Amscott House, East Redford, England	84
Phipard, Harvey Fisk	Care of H. T. Phipard, Singer Manufacturing Company, 149 Broadway, New York	2
Phipard, Wm. George		1
Phipard, Chas. Butler		1
Phipard, Clarence Lester		1
Raphael, Lewis	45 Wall street, New York, care of J. Kennedy Tod & Co.	14
John Henry Savile and Chas. John Mander, executors estate of Anne Raphael.	do	14
Simons, J. Edward	14 Nassau street, New York	1
Von Hoffman, L. & Co	26 Exchange place, New York	10
Total		70,000

NEW YORK, March 6, 1902.

The CHAIRMAN. The other day it was stated, by Admiral Walker, I believe, that the latest sale of the stock of your company was at 60 cents on the dollar.

Mr. DRAKE. I think it was 65 or 66 cents, sir. The stock is offered by a peripatetic broker now in a public way. He is sending around circulars offering it at 82½. I believe he has a hundred shares for sale. Of course the company does not buy its own stock, and at this juncture nobody else wants to buy it.

The CHAIRMAN. There are no takers at 82½?

Mr. DRAKE. Not at the moment, it seems, because he is offering it on a declining scale.

The CHAIRMAN. It is worth a great deal more than that, is it not?

Mr. DRAKE. I should think so, sir, especially if, as I anticipate——

The CHAIRMAN. What do you anticipate that will make it rise?

Mr. DRAKE. I anticipate inevitably, sir, that the United States Government will construct the Panama Canal. I say this apologetically, differing from your opinion.

I should like to say that I abandoned a career as a leading stock-broker for thirty years to become interested in the Panama Railroad, because I believed in the inevitable construction of the Panama Canal as the most proper and natural one by some means, and I wanted to be connected with it when it was. My prominence in the financial world can easily be verified. I only speak of that to account for my identification with the Panama Railroad Company from that time. I have always believed on the theory of the survival of the fittest, that the Panama Canal would ultimately be constructed. I think so still.

The CHAIRMAN. You are not connected with it for the purpose of making any money, then.

Mr. DRAKE. Not in any way. I have nothing more than an official connection with the Panama Railroad Company.

The CHAIRMAN. You say you have a very fine property?

Mr. DRAKE. I speak of that with official pride. I think it is unique. We do not owe a dollar to anybody. On the 10th, 15th, and 20th of each month various monthly pay rolls are liquidated, and on that day we do not owe a cent to anybody. We have a property worth \$13,000,000, which is covered only by a mortgage indebtedness of \$2,500,000. We owe nothing beyond that, and the physical condition of the property speaks for itself. We have operated our steamers now for five or six years without an accident of any kind. We never have any accidents on our railroad, except little ones, and the property is kept up in first-class condition, with a personnel that I will compare to-day with that of any other corporation in the world. That is what I mean when I say I am proud of the Panama Railroad Company, simply as an executive officer.

The CHAIRMAN. Now, if the Government of the United States, without consulting you at all, should go on and build a canal there across that Isthmus, and build a railroad——

Mr. DRAKE. They can not build a railroad unless they acquire a superior concession to ours. We have the preeminent right until 1966 to the maintenance and operation of a railroad under our concession from Colombia.

The CHAIRMAN. Suppose that it should turn out that Colombia and the United States were stronger than your company?

Mr. DRAKE. Oh, well, then we would be the sufferers.

The CHAIRMAN. Suppose that the United States goes on now and builds the canal——

Mr. DRAKE. The United States, I think, can be relied on to protect——

The CHAIRMAN. And suppose they do that in ten years. What becomes then of your fine property?

Mr. DRAKE. I have no doubt but that the United States will make proper provision for this property, sir.

The CHAIRMAN. Well, then——

Mr. DRAKE. I will say in explanation of that that the 69,000 shares of the stock held by the canal company—I only want to give an intelligent answer, sir——

The CHAIRMAN. That is right.

Mr. DRAKE. If the United States comes to an understanding with the canal company and with the Republic of Colombia, by which it is to construct the canal, in acquiring the canal property it will acquire 69,000 shares of the stock of the Panama Railroad Company, so that whatever it does to the railroad it will do to itself.

The CHAIRMAN. Will it not destroy the commercial value of the railroad when it builds the canal there?

Mr. DRAKE. I can not imagine that the Government has any other reason in constructing the canal than to develop the commercial capabilities of the Isthmus, and I can not imagine for a moment that during the time of the construction of the canal it will do anything to drive commerce away. The railroad was operated during the canal construction period, and the earnings of the railroad were simply enormous at that time. We paid very heavy dividends, and under an intelligent policy I have not the slightest doubt that the course of the United States would be to preserve the existing traffic and to attract additional traffic, and operate the present road, which is capable of handling three times the traffic it is handling now. I have no doubt the United States will operate that road so as to furnish all the facilities required for construction, and at the same time preserve the traffic of the road, to go through the canal when completed. That is my theory of it, sir.

The CHAIRMAN. When it is completed, then what will become of the railroad traffic?

Mr. DRAKE. I have a different idea from almost anybody on that. Shall I answer you? If you ask me questions, I am glad to answer you on this subject. I am speaking for myself.

The CHAIRMAN. That is right.

Mr. DRAKE. I have an idea that the railroad will always be necessary. Canals have never driven railroads out of business. Now, in ten years the aggregate traffic of all that territory is going to develop in many ways. Americans are very slow to appreciate what they have right there at their doors on that west coast of North and South America, which now sustains 5,000,000 people, but which ultimately will sustain 100,000,000 people. The aggregate of that traffic is going to develop. It is on that great geographical divide. A certain part will go by the Isthmus. If the canal is constructed there, there is going to be a great deal of local business. The present business of the steamship lines operating on the Pacific coast is necessarily circulatory. They are not going through the canal, all of them, because in the course of their itinerary when they reach the mouth of the canal their cargoes will be exhausted and there will be other cargoes to take back to their home ports.

The same is going to be true of the nine lines converging at the Isthmus on this side. Many of them are operating under postal contracts, and all of them are operating on itineraries which require the

carriage of portions of their cargoes to various ports at which they stop before reaching Colon, and by the time they reach the mouth of the canal they will be partly rid of their cargo. They can not differentiate between their business that will cross the Isthmus and that which will not. That will contribute to the permanence and development of the railroad. The moment that canal is built there is going to be a tremendous development of the natural resources of Colombia. Americans ought to be more familiar with it than anybody else, and we, who ought to know more about it than anybody else, can not appreciate what there is right at the end of our line there, because there is no means of transportation from 40 miles in the interior.

There is a great wealth of natural resources there that there is no means of bringing down to our railroad. The moment that canal is built there is going to be a tremendous development there. I hope I am not talking too fast. This is a subject in which I am very much interested, and I could talk without limit upon it. This is not a new proposition. You can easily recall, in the days of the stage coaches, when the prediction was made that there would not be business enough to justify a transcontinental railroad, or if there was business enough for one, that would be all there would ever be any use for.

There are eighteen lines now. So I say there will always be business for the Panama Railroad Company. That is my line of thought. You have pressed the button on me, and my thoughts flow very freely. The main point is this: Canals are never free from exigencies and contingencies. The Panama Canal traffic might be interrupted by one of a hundred incidents of which engineers can tell you better than I can. Then the railroad would come into play to maintain the traffic and to hold the business during the interval. What I say is that the railroad can be so developed, and probably would be by intelligent handling, as to be able to accommodate three times its present traffic.

The CHAIRMAN. You have been talking upon the hypothesis——

Mr. DRAKE. I have been talking entirely on a hypothesis.

The CHAIRMAN. You have been talking upon the hypothesis that the United States should become the owner of the Panama Railroad.

Mr. DRAKE. Yes.

The CHAIRMAN. And you suggest, or rather you contend, that at the end of the construction of the canal the railroad would still be a useful property to the United States for transportation purposes.

Mr. DRAKE. That is my deep-seated conviction, sir.

The CHAIRMAN. And as many ships would come from this side and stop at Colon or at Panama, and you find from those points that that would terminate the——

Mr. DRAKE. Yes; they would go on beyond Panama, many of them; but let me explain one thing there——

The CHAIRMAN. There would not be much use for the canal in that case, except to take the war ships of the United States from one coast to the other, or to allow ships that wanted to go through for some other purpose to do so, but not to extend their through business, if your hypothesis is correct.

Mr. DRAKE. Excuse me, I make a distinction between through business and local business. I speak of the development of local business, enough to justify the continuance of the railroad.

The CHAIRMAN. I am supposing that the Government of the United States and the Government of Colombia agree that the United States may take over this property that is there.

Mr. DRAKE. Yes.

The CHAIRMAN. With such concessions as are suitable to us, with the right to construct a railroad there, if they choose to do it for the maintenance of the canal, for its convenience.

Mr. DRAKE. To construct another railroad?

The CHAIRMAN. To construct another one. Now in that case your property would be destroyed, would it not?

Mr. DRAKE. It would be the property of the United States.

The CHAIRMAN. But its value as a commercial facility would sink out of sight, would it not?

Mr. DRAKE. It would depend entirely upon whether the Government would operate its road as a traffic road or merely a construction road. But may I ask the question, Is it reasonable to suppose that the Government would construct another railroad when there is already one there?

The CHAIRMAN. We do not know, in these days of cupidity, what is reasonable when it stands against men's interests. I am trying to provide for any case that may come up. Suppose your company should refuse to enter into any agreement with Colombia by which its rights should be forfeited there as property sold out, and that it should insist that it should continue in business there, as it is prosperous and successful at the present time.

Mr. DRAKE. We have no right to refuse.

The CHAIRMAN. If you will allow me: Suppose the State of New York should also refuse to repeal that charter or in anywise to abridge its authority. These are vested rights that the United States Government, under its Constitution, is bound to respect. Suppose that state of affairs should exist, and the United States should go on, notwithstanding, and construct a canal, and build a railroad there for the purpose of aiding in its construction, if it is necessary to do so. Now, then, you would be there with your rights under the charter of the State of New York and we could not move you out of your rights or disturb them unless the State of New York would consent through its legislature. You are protected by that State.

Mr. DRAKE. Article 2 of our concession reads, sir:

"But it remains stipulated that the right which is conceded to the company to give its consent does not extend to it opposing the construction of a canal across the Isthmus of Panama——"

The CHAIRMAN. What do you read from?

Mr. DRAKE. From the concessions to the railroad from Colombia. Colombia has distinctly reserved that.

The CHAIRMAN. I am glad you mentioned that. That is the concession from Colombia?

Mr. DRAKE. Yes; we can not object to the construction of a canal across the Isthmus.

The CHAIRMAN. Except at a certain point?

Mr. DRAKE. Not at any point, sir. We can not object. The concession says:

"But it remains stipulated that the right which is conceded to the company to give its consent does not extend to its opposing the construction as a canal across the Isthmus of Panama except on the actual route of the railroad itself."

The CHAIRMAN. That is what I mean. There is that restriction. As long as that concessionary right obtains in favor of your company we could not go there and build a canal on the route of the railroad,

unless Colombia should authorize us to do it. If it should do that, then you would have very little standing in court after that, I suppose.

Mr. DRAKE. I can not put my opinion against yours on that, sir; and still I think——

The CHAIRMAN. I am not speaking of the justice of it. I am speaking of the question of power.

Mr. DRAKE. The question of power you get by controlling the railroad. The railroad is prohibited from not giving its consent. It must give its consent. So by acquiring the rights of the canal property in the Panama Railroad, or its stock, you acquire the consent of the railroad.

The CHAIRMAN. Has your railroad company given its consent in any form whatever to the sale of this property to the United States for \$40,000,000?

Mr. DRAKE. No, sir; it does not have to. It has not been called upon and I do not imagine that it would be. It does not have to give its consent.

The CHAIRMAN. Your assertion that it does not have to give its consent——

Mr. DRAKE. That is voluntary entirely. I do not know that it has to.

The CHAIRMAN. Do you think we can take your rights and dispose of them without your consent?

Mr. DRAKE. I can only answer by saying, as I did before, that if the United States acquires the right to build the canal across the Isthmus from the Panama Canal Company it will at the same time acquire the stock which the Panama Canal Company holds in the railroad company, and by that acquisition will get the same right to construct the canal that the Panama Canal Company have, and will also have control of the stock of the railroad company.

The CHAIRMAN. The United States can not do that by acquiring the stock——

Mr. DRAKE. That stock is one of the assets of the canal company.

The CHAIRMAN. And then the United States would be stockholder in your railroad?

Mr. DRAKE. Yes.

The CHAIRMAN. Then the United States Government would have a vote in your board?

Mr. DRAKE. Yes; it would acquire the same rights that the present stockholders have, and it might just as well be the United States as anybody else.

The CHAIRMAN. You are anticipating that the Government of the United States, in order to get the right from the Panama Canal Company to your railroad, would buy the stock and become a stockholder, and would have the right to go into your board meeting that elects directors?

Mr. DRAKE. In the schedule of assets put in by the canal company, I notice that the railroad is put in as one of the assets. It is put in at \$10,000,000 as one of the assets.

The CHAIRMAN. I am not talking about what they are doing.

Mr. DRAKE. I say, I suppose——

The CHAIRMAN. You are trying to answer a question before I have asked it.

Mr. DRAKE. I beg your pardon. I have not the slightest desire to do that.

The CHAIRMAN. The United States would then become a stockholder in the Panama Railroad Company to the extent of the stock it had bought from the Panama Canal Company?

Mr. DRAKE. Yes.

The CHAIRMAN. And would go into your board and assist in electing directors?

Mr. DRAKE. Yes.

The CHAIRMAN. And would maintain the present organization under the charter as it exists, and the by-laws as they exist, except as they might be altered?

Mr. DRAKE. Yes.

The CHAIRMAN. And would become a part and parcel of the Panama Railroad Company?

Mr. DRAKE. The United States Government?

The CHAIRMAN. Is that your expectation?

Mr. DRAKE. I have not any such idea, sir. My idea——

The CHAIRMAN. Is it your idea that by becoming the owner of the stock of the Panama Canal Company the United States could wipe out all of the rights that exist there in favor of the minority stockholders in the railroad company.

Mr. DRAKE. My idea is that the United States will ultimately obtain the ownership of all of the stock. There are only a few hundred shares outstanding. Then the United States would be the sole proprietor of the railroad company.

The CHAIRMAN. What is your opinion as to the reason why this very valuable stock is kept down to 60 or 80 cents on the dollar?

Mr. DRAKE. I will have to give you a stockbroker's answer, sir. There are a great many instances of the same kind on the stock exchange list, where minority stockholders are ignored. In this case the canal company has all the stock that it wants, and the others who lost their opportunity to sell have not found as good a market since.

The CHAIRMAN. And it is the expectation that they will be ignored that depresses the stock in their hands?

Mr. DRAKE. I do not venture any opinion on that point, sir. There are outstanding shares which in good business practice I should think would be acquired too, but I do not know what would be done. The Government, in acquiring the canal, would acquire a large majority of the stock.

The CHAIRMAN. At the time the present Panama Canal Company—the new Panama Canal Company—was organized, there was a provision in its charter, what they call the statute, you know, that the liquidator should convey the rights and interests held by the old Panama Canal Company to the new company in the railroad, absolutely and irrevocably conferring upon them a title that is inalienable in the new company, so that in the event that the canal failed, the new company, on the payment of 20,000,000 francs, would have a perfect title to the property. You remember that, do you not?

Mr. DRAKE. Yes; I have a recollection of it. I could not define it as well as you have done, because I do not recall it as specifically.

The CHAIRMAN. Do you know why such an arrangement as that was entered into?

Mr. DRAKE. I do not, sir. I know that as far as we are concerned the original liquidator, Mr. Gautron, is the principal stockholder to-day.

The CHAIRMAN. You say as far as you are concerned?

Mr. DRAKE. As far as the stockholders or the railroad company appear. I do not know the affairs of the canal company except by the reports. I have no connection with the canal company. I only know what I read of it.

The CHAIRMAN. The liquidator is a stockholder in the new company?

Mr. DRAKE. The principal stockholder in our company.

The CHAIRMAN. How is that?

Mr. DRAKE. The stock stands in the name of Jean Pierre Gautron, who is the liquidator of the old company.

The CHAIRMAN. He is a stockholder?

Mr. DRAKE. He is a stockholder to-day.

The CHAIRMAN. Does he do the voting?

Mr. DRAKE. Yes.

The CHAIRMAN. The liquidator does the voting?

Mr. DRAKE. Yes.

The CHAIRMAN. Not the president of the new canal company?

Mr. DRAKE. Not unless he does it as proxy. Mr. Gautron does not vote personally. He does it by proxy, I understand.

The CHAIRMAN. If that is so, why does the liquidator do the voting?

Mr. DRAKE. He has the right to do it. He may delegate it——

The CHAIRMAN. How can he have the right to do it?

Mr. DRAKE. By holding the stock. The stock is in his name, and he gives his proxy to whom he chooses. He can make an arrangement with the new canal company by which he may do that. I do not know that; I only speak of it hypothetically.

The CHAIRMAN. Then your connection with it and your dealings with the Panama Canal Company are dictated exclusively through the liquidator?

Mr. DRAKE. I must answer that by saying that he is named as the stockholder. Our dealings with the canal company are addressed to the officers of the new canal company. Our relations with the canal company are with the new canal company.

Mr. Gautron, who is the stockholder of record, I know to be the liquidator of the old company, that is all. We do not have any dealings with him.

The CHAIRMAN. He has dealings enough with you to elect your board!

Mr. DRAKE. Yes.

The CHAIRMAN. And he does it, and you stated a while ago that there had been no stockholder elected there by the minority, that they are all elected by this French representative of the stock.

Mr. DRAKE. I did not say that the minority did not vote. Our records of the annual elections will all show that all but a very few shares of stock voted at every election.

The CHAIRMAN. They vote, and are defeated?

Mr. DRAKE. There never has been an opposition ticket, sir.

The CHAIRMAN. Who dictates the ticket?

Mr. DRAKE. That I do not know, sir. I record it as voted.

The CHAIRMAN. But it goes the French way every time, does it not?

Mr. DRAKE. Oh, undoubtedly.

The CHAIRMAN. The liquidator does that?

Mr. DRAKE. By his representative.

The CHAIRMAN. Well, I mean either he or his proxy.

Mr. DRAKE. Yes.

The CHAIRMAN. Some person acting under his orders? The president of the canal company has not anything to do with casting the vote of that stock in the stockholders' meetings.

Mr. DRAKE. Unless he holds the proxy from Mr. Gautron.

The CHAIRMAN. In his own right, I mean, as president of that company, he has nothing to do with voting that stock?

Mr. DRAKE. No, sir.

The CHAIRMAN. It is the liquidator who votes it.

Mr. DRAKE. Whoever is the stockholder.

The CHAIRMAN. It is the liquidator.

Mr. DRAKE. The liquidator now. That is the distinction I am making. It is the liquidator now who is the stockholder.

The CHAIRMAN. And it has been the liquidator ever since this new Panama Canal Company was organized, has it not?

Mr. DRAKE. I can not answer that definitely to-day, but I can answer the question later.

The CHAIRMAN. Since the new Panama Canal Company was organized has there ever been any representative in a stockholders' meeting except the liquidator of the old company?

Mr. DRAKE. Oh, yes; the new canal company has been represented there. Mr. Boyard is now the representative of the new canal company.

The CHAIRMAN. What does he vote?

Mr. DRAKE. The regular ticket. He votes whatever proxies he has. He has held proxies from both the new and the old canal companies. He holds proxies for the entire amount of stock.

The CHAIRMAN. I have got it very much confused in my mind some way.

Mr. DRAKE. I hope I can make it plain, sir; I will try to, if you will allow me. Mr. Boyard has held proxies both from the liquidator and from the new canal company, alternately, as the stock has been lodged in one way or the other.

The CHAIRMAN. Then it has been there in two names.

Mr. DRAKE. No; it has been there all in one or the other. It has been there alternately——

The CHAIRMAN. Sometimes in the name of the liquidator and sometimes in the name of the president of the new company.

Mr. DRAKE. I believe at one period it was in the name of the new company.

The CHAIRMAN. When was that?

Mr. DRAKE. I shall have to find out.

The CHAIRMAN. About when was it?

Mr. DRAKE. Two or three years ago—two years ago—the election of 1899, or 1900, I should say.

The CHAIRMAN. Was it not since the decree was made in the French courts authorizing the sale of the stock, that the company became the representative of the stock instead of the liquidator? Was it not since that period?

Mr. DRAKE. I do not know, sir. I can not answer that. I did not look into it. If at all, it was certainly since the creation of the new canal company.

The CHAIRMAN. I know that, at least I am convinced of it. So that at one period since the organization of the new canal company the liquidator has represented this stock that is held by the Panama Canal Company. Am I correct in that?

Mr. DRAKE. Yes; I should like to answer your question by saying that at the present time the liquidator is the stockholder of the majority of the stock—the liquidator of the old canal company.

The CHAIRMAN. At the present time?

Mr. DRAKE. At the present time.

The CHAIRMAN. But there has been an intermediate period?

Mr. DRAKE. There has been an intermediate period when the stock was in the name of the canal company. I can refresh my recollection as to the date.

The CHAIRMAN. Who voted the stock then?

Mr. DRAKE. Whoever held the proxy.

The CHAIRMAN. I do not mean the individual.

Mr. DRAKE. The canal company—whoever the canal company gave its proxy to—voted the stock, sir.

The CHAIRMAN. So it is since the organization of the Panama Canal Company that the liquidator was the representative of this stock in your company?

Mr. DRAKE. I do not know that it is; no, sir. I am not clear about that.

The CHAIRMAN. There was a period during which he was the representative of the stock?

Mr. DRAKE. I think so, sir.

The CHAIRMAN. That was succeeded by a period during which the company itself was represented as the holder and owner of the stock?

Mr. DRAKE. Yes, sir.

The CHAIRMAN. And now at the present time the liquidator holds and owns that stock?

Mr. DRAKE. Yes.

The CHAIRMAN. How do you become informed of these changes?

Mr. DRAKE. By the transfers on our books.

The CHAIRMAN. The transfers are made there?

Mr. DRAKE. Yes; the transfers are made on our books.

The CHAIRMAN. You have not got those books with you?

Mr. DRAKE. No, sir; that is in the hands of the treasurer of the company. The transfers are made by the treasurer of the company.

The CHAIRMAN. Do you have the books under your supervision?

Mr. DRAKE. Entirely; yes, sir.

The CHAIRMAN. You have access to them?

Mr. DRAKE. Yes.

The CHAIRMAN. I will ask you, when you go home, and before your deposition is finally completed, to make a copy and include it in your statement, of each of these transfers of the stock on your books.

Mr. DRAKE. I will do so.

March 19, 1895.

Paul Arthur Cheramy.....	30,500	
Henry Boudet.....	1,034	
Paul Emile Francois Hyronimus.....	37,000	
To Jean Pierre Gautron.....		68,534

June 7, 1895.

Jean Pierre Gautron to Comptoir National d'Escompte de Paris..... 68, 534

November 5, 1900.

Le Comptoir National d'Escompte de Paris to Jean Pierre Gautron, liquidator de la Cie. Univer. du Canal Interoceanique de Panama..... 68, 534

NEW YORK, March 7, 1902.

The CHAIRMAN. I wish you would also give the committee a statement of the net earnings of the Panama Railroad Company from the beginning.

Mr. DRAKE. Since 1854?

The CHAIRMAN. From the time it commenced operation.

Mr. DRAKE. I will make a memorandum and supply it, sir; I haven't it here now. I have a statement of the present condition of the road, but I have not a statement since 1850. Recently we had an expert accountant go over the affairs of the company since its incorporation, and as a part of his report I have that information and can send it to you.

The CHAIRMAN. You can carry it back to 1850?

Mr. DRAKE. I can carry it back to the organization of the road; yes, sir.

The CHAIRMAN. I wish you would do so.

Net earnings.		Net earnings.	
1852	\$171, 759. 33	1877	\$1, 071, 683. 37
1853	202, 334. 65	1878	1, 079, 626. 06
1854	181, 212. 29	1879	1, 120, 957. 46
1855	591, 278. 55	1880	1, 102, 258. 39
1856	847, 629. 72	1881	1, 306, 406. 03
1857	591, 481. 49	1882	1, 082, 535. 29
1858	735, 653. 72	1883	1, 151, 791. 67
1859	579, 206. 65	1884	1, 175, 823. 67
1860	765, 628. 23	1885	71, 609. 56
1861	841, 287. 04	1886	118, 581. 20
1862	1, 309, 527. 70	1887	619, 831. 37
1863	1, 159, 898. 30	1888	1, 150, 544. 45
1864	1, 815, 013. 65	1889	384, 149. 69
1865	1, 258, 744. 59	1890	348, 873. 82
1866	3, 054, 441. 70	1891	323, 800. 83
1867	1, 838, 301. 84	1892	182, 816. 90
1868	2, 465, 697. 52	1893	*133, 699. 61
1869	972, 521. 78	1894	*80, 776. 02
1870	343, 315. 49	1895	62, 943. 85
1871	244, 680. 20	1896	545, 684. 53
1872	700, 584. 48	1897	409, 873. 37
1873	579, 774. 39	1898	266, 746. 73
1874	562, 001. 91	1899	295, 231. 77
1875	730, 714. 21	1900	446, 764. 68
1876	695, 147. 04	1901	259, 590. 12

* Deficit.

NEW YORK, March 7, 1902.

The CHAIRMAN. In ascertaining the net earnings do you take betterments into account?

Mr. DRAKE. That all goes to operating expenses, as a rule.

The CHAIRMAN. You take account of that, of course.

Mr. DRAKE. Yes.

The CHAIRMAN. And your net earnings are above that?

Mr. DRAKE. Yes.

The CHAIRMAN. After all expenses are taken out, of every kind and character?

Mr. DRAKE. There are two grades of that. The net earnings are shown, from which net earnings are deducted the fixed charges, and then comes the actual income.

The CHAIRMAN. And you include in your estimate before you reach the net earnings, in your estimate of gross expenses, you include all betterments?

Mr. DRAKE. Everything, sir.

The CHAIRMAN. All improvements of every kind?

Mr. DRAKE. Yes.

The CHAIRMAN. And also include fixed charges?

Mr. DRAKE. Yes; and the result of that for the last five years I have here. In 1896 the net earnings in excess of everything were \$545,684.53.

The CHAIRMAN. How much of your operating expenses included betterments?

Mr. DRAKE. I would have to get the report for that year, sir. We have them all bound, and I can get at it.

For 1897, the net earnings in excess of everything were \$409,873.37; for 1898, \$266,746; for 1899, \$295,231.77; for 1900, \$446,764.68.

For 1901 the summary has just been made, and while I haven't it before me I know it is \$259,000. In that account there has been an improvement account—we have opened a betterment account—and a small proportion of the charges for that year are made up of a proportionate charge from that betterment account; but it amounts to something like a quarter of \$150,000 only.

The CHAIRMAN. In connection with that channel that was dug through the bay of Panama, a question has occurred to me that I omitted to ask you. Did the canal company or the railroad company pay for digging that channel?

Mr. DRAKE. The canal company.

The CHAIRMAN. But still the railroad company are under obligation to do it under their concession.

Mr. DRAKE. Not at all, sir.

The CHAIRMAN. Did you not state that you were under obligation to carry your railroad to deep water?

Mr. DRAKE. Not to that point. That was the contention between Colombia and the railroad company.

By article 4 of our contract with Colombia we were obliged to "extend the railroad on the Pacific side to the islands of Naos, Culebra, Perico, and Flamento, or other places in the bay where there may exist a permanent depth of water for large vessels."

After the canal company had completed its trench or channel there, we claimed that by constructing a branch road to La Boca from La Bomba, a station a short distance outside of Panama, we were reaching deep water, and we did that. We constructed this branch road and built our pier at deep water, and we insisted that in that way we had carried out our contract.

The CHAIRMAN. What is the length of that branch road?

Mr. DRAKE. A mile and a half.

The CHAIRMAN. By constructing a mile and a half of road and a pier there you got to deep water?

Mr. DRAKE. Yes.

The CHAIRMAN. But you got there because the canal company had dredged in to you.

Mr. DRAKE. Yes.

The CHAIRMAN. How far did they dredge?

Mr. DRAKE. Three miles and a half.

The CHAIRMAN. How wide and how deep?

Mr. DRAKE. Mr. Paine can answer that question as to the width and depth of the channel from the island.

Mr. PAINE. About 300 feet wide.

Mr. DRAKE. And at dead low tide it is 19 feet deep. There is a variation of tide of 20 feet, so that at times it is 39 feet deep.

The CHAIRMAN. You have never paid the canal company anything for that dredging?

Mr. DRAKE. Not at all, sir. But all the dredging that has been done since we have done at our own expense.

The CHAIRMAN. You took advantage of that $3\frac{1}{2}$ miles that the canal company dredged without paying for it?

Mr. DRAKE. Absolutely.

Mr. PAINE. That La Boca branch is $2\frac{1}{2}$ miles instead of $1\frac{1}{2}$ miles?

Mr. DRAKE. I beg pardon. It is $2\frac{1}{2}$ miles instead of $1\frac{1}{2}$.

Mr. PAINE. Including the pier?

The CHAIRMAN. That is all I care to ask.

Senator KITTREDGE. The Panama Railway Company is a corporation organized under a special law of the State of New York?

Mr. DRAKE. Yes; a charter dated in 1849.

Senator KITTREDGE. I show you this document marked "Charter and amended by-laws of the Panama Railroad Company," and ask you if that is the charter of which you have spoken?

Mr. DRAKE. That is it, sir.

Senator KITTREDGE. You make that a part of your testimony?

Mr. DRAKE. Yes, sir.

The charter and by-laws are as follows:

CHARTER AND AMENDED BY-LAWS OF THE PANAMA RAILROAD COMPANY.

AN ACT to incorporate the Panama Railroad Company, passed April 7, 1849.

The people of the State of New York, represented in senate and assembly, do enact as follows:

SECTION 1. William H. Aspinwall, John L. Stephens, Henry Chauncey, James Brown, Cornelius W. Lawrence, Gouverneur Kemble, Thomas W. Ludlow, David Thompson, Joseph B. Varnum, Samuel S. Howland, Prosper M. Wetmore, Edwin Bartlett, Horatio Allen, and their associates, successors, and assigns, are hereby constituted a body corporate, by the name of the "Panama Railroad Company," for the purpose of constructing and maintaining a railroad, with one or more tracks, and all convenient buildings, fixtures, machinery, and appurtenances across the Isthmus of Panama, in the Republic of New Granada, under the grant made by the said Republic to the said William H. Aspinwall, John L. Stephens, and Henry Chauncey, and of purchasing and navigating such steam or sailing vessels as may be

proper and convenient to be used in connection with the said road; and for such purposes all the necessary and incidental power is hereby granted to the said corporation.

SEC. 2. The capital stock of the said corporation shall be fixed by the directors at a sum not less than one million of dollars, with liberty to increase the same at any time to a sum not exceeding five millions of dollars. Said stock shall be divided into shares of one hundred dollars each, and shall be deemed personal property, transferable in such manner as the by-laws of the said corporation shall direct. The said corporation may commence operations when five hundred thousand dollars shall have been subscribed, and twenty per cent on each share subscribed for paid in. The said William H. Aspinwall, John L. Stephens, and Henry Chauncey shall be commissioners to receive subscriptions for the said capital stock, and if the whole capital stock shall not be subscribed at the time first appointed other subscriptions may be at any time received until the whole amount shall be subscribed at such times and under such rules and regulations as they shall prescribe.

SEC. 3. The concerns of the said corporation shall be managed by thirteen directors, who shall be stockholders, and who (except the first directors hereby appointed) shall hold their offices for one year and until others are chosen in their places. The persons named in the first section of this act shall be the first directors, and shall hold their offices until the first Monday of April, in the year one thousand eight hundred and fifty-one, and until others are chosen in their places. The directors, except for the first two years, shall be annually chosen at such time and place in the city of New York, and on such notice, as shall be directed by the by-laws of the said corporation. In all meetings of the stockholders each share shall entitle the holder to one vote, to be given in person or by proxy. In case it should at any time happen that an election of directors shall not be made on the day appointed by the by-laws of the said corporation, the said corporation shall not for that cause be deemed to be dissolved, but such election shall be held on any other day which shall be appointed by the directors of said association.

SEC. 4. The directors (of whom five shall constitute a quorum for the transaction of business) shall appoint one of their number to be president, and may appoint such other officers and agents as they shall deem necessary, and they may make and establish such by-laws, rules, and regulations as they shall think proper and expedient, touching the disposition and management of the property, estate, and effects of the said corporation, the transfer of shares, the duties and conduct of their officers and servants, the election and meeting of the directors, and all matters whatsoever which may appertain to the concerns of said corporation. When any vacancy shall happen among the directors it may be filled by the remaining directors; and the directors may remove all officers appointed by them and appoint others in their place and fill all vacancies in the offices.

SEC. 5. The directors may require payments of subscriptions to the stock at such times and in such proportions as they may deem proper, under the penalty of forfeiting all stock and previous payments made thereon, and may sue for and recover all such subscriptions. Notice of the time and place of such payments shall be published for four weeks previous to such time, at least once in each week, in two newspapers published in the city of New York.

SEC. 6. The said corporation may have a common seal, and the same may alter or renew at pleasure; and all contracts made may be either verbal or under the signature of the president, secretary, or other officer or agent of the said corporation, and with or without the corporate seal.

SEC. 7. It shall be lawful for the said corporation to contract with the said William H. Aspinwall, John L. Stephens, and Henry Chauncey, for the purchase of all the rights, privileges, and immunities granted to them by the said Republic of New Granada, and for the purchase of the lands granted to them by the said Republic, and to receive a conveyance of, and hold the same in like manner as the said William H. Aspinwall, John L. Stephens, and Henry Chauncey now do or can do; and to lease, or sell and convey any of such lands which the said corporation shall not deem it necessary to retain, and to build and construct all such buildings, piers, docks, basins, and harbors on the said lands as the said corporation may deem expedient, in like manner as the said William H. Aspinwall, John L. Stephens, and Henry Chauncey can do under the said grant.

SEC. 8. The said corporation may borrow from time to time such sum or sums of money as may be necessary to complete said road, and for the other purposes authorized by this act, in the whole not exceeding the amount of the capital stock actually paid in, and may issue and dispose of their bonds for any amount so borrowed; and are hereby authorized to mortgage any part of their corporate property and privileges to secure the payment of such bonds; and the said directors may confer on the holder of any bond they may issue, for any money so borrowed, the right to convert the principal due thereon into stock of the said corporation at any time not exceeding five years from the date of said bond, under such regulations as the directors may see fit to adopt; and for such purpose the said corporation are authorized to increase its capital stock to the amount so borrowed, whenever the persons, or any of them, to whom such money is due, shall elect to convert the same into stock; but nothing herein contained shall be construed to authorize an increase of the capital stock of said company beyond the sum of five millions of dollars.

SEC. 9. Each and every stockholder shall be individually liable to the creditors of said corporation for all debts that may be due and owing by said corporation to their laborers and servants for services performed, and for all other debts and liabilities of the said corporation, to an amount equal to the amount of stock held by him, until he shall have paid in full the amount of such stock so held. But no stockholder shall be personally liable for the payment of any debt contracted by the said corporation which is not to be paid within one year from the time the debt is contracted, nor unless a suit for the collection of such debt shall be brought against said corporation within one year after the debt shall become due; and no suit shall be brought against any stockholder in said corporation for any debt so contracted, unless the same shall be commenced within two years from the time he shall have ceased to be a stockholder in said corporation, nor until an execution against the corporation shall have been returned unsatisfied in whole or in part. No person holding stock in said company as executor, administrator, guardian or trustee, and no person holding such stock as collateral security, shall be personally subject to any liability as a stockholder of said company, but the person pledging such stock shall be considered

as holding the same, and shall be liable as a stockholder accordingly, and the estate and funds in the hands of such executor, administrator, guardian, or trustee shall be liable in like manner and to the same extent as the testator, or intestate, or the ward, or person interested in such fund would have been if he had been living and competent to act, and held the stock in his own name. Every such executor, administrator, guardian, or trustee shall represent the shares of stock owned by him as such administrator, guardian, or trustee at all meetings of the company, and may vote as a stockholder, and every person pledging his stock as aforesaid may in like manner represent the same and vote accordingly.

SEC. 10. This act shall take effect immediately.

AN ACT to amend the act entitled "An act to incorporate the Panama Railroad Company," passed April 7, 1849, passed April 12, 1855.

The people of the State of New York, represented in senate and assembly, do enact as follows:

SEC. 1. It shall be lawful for the Panama Railroad Company to borrow, from time to time, in addition to the amount limited by the act to incorporate said company, passed April 7, 1849, such sum or sums of money as may be necessary to complete their road, and for the other purposes authorized by said act; to issue and dispose of their bonds for the reimbursement of any amount to be borrowed, or which may have been borrowed by them, and to mortgage any part of their corporate property and privileges to secure the payment of said bonds; and they may confer upon the holder of any bond which they may so issue the right to convert the principal represented thereby into the stock of said corporation at any time not exceeding five years from the date of said bond, under such regulations as the directors may see fit to adopt, whenever any person or persons holding any such bond shall elect to convert the same into stock; and for such purpose the said incorporation are hereby authorized to increase their capital stock from time to time; so, however, that the whole capital of said company shall not exceed the sum of seven millions of dollars, anything in said act to the contrary notwithstanding.

SEC. 2. This act shall take effect immediately.

AMENDED BY-LAWS.

ARTICLE I. The election for directors of this company shall be held at the office of the company, in the city of New York, on the first Monday of April in each year. Three stockholders shall be chosen by the board at a preceding meeting to act as inspectors. The polls shall be opened at noon and continue open until two o'clock in the afternoon. The board of directors shall consist of thirteen stockholders, five of whom, if the president or first vice-president or second vice-president be one, shall constitute a quorum for the transaction of business at the meetings of the board.

ARTICLE II. The officers of this company shall consist of a president, a first vice-president, a second vice-president, a secretary, and a treasurer; the two latter to hold office at the pleasure of the board; the offices of first vice-president or second vice-president and general manager may be filled by one person, and the offices of second vice-president and secretary may be filled by one person. The president, first vice-

president, and second vice-president, respectively, shall always be members of the board of directors, and the said officers shall be elected by the board annually, within eight days after the election of the directors. The vote shall be by ballot, and a majority of all the members of the board shall be necessary to a choice. In addition to the officers before named, the board may from time to time appoint a general manager, an assistant general manager, and such additional officers, engineers, and agents as the business of the company may require. The salaries of the several officers, engineers, or agents shall be fixed by the board and no extra allowance or compensation shall be made except with the approbation of the board.

In case of any failure to hold any election for officers, those in office shall hold their places and be legally qualified to act until an election shall be held.

ARTICLE III. The duties of the president shall be to preside at the meetings and to exercise a general supervision over the affairs of the company. He shall have power to call meetings of the directors at such time or times as he shall think proper, and it shall be his duty to call such meetings upon the written requisition of two or more of the directors, stating the object for which they wish such meetings convened. The first vice-president shall, in the absence of the president, exercise all the powers and functions which may in any way be delegated to the president. The second vice-president shall, in the absence of the president and first vice-president, exercise all the powers and functions which may in any way be delegated to the president.

It shall be the duty of the general manager to have charge of and to manage and direct the practical operations and business of the railroad and steamship lines and transportation interests of the company in America, on the Isthmus, and elsewhere. The assistant general manager shall perform such duties as may be assigned to him by the general manager, and in the absence of the latter, shall exercise and perform, as assistant general manager, the duties of the general manager.

ARTICLE IV.—It shall be the duty of the treasurer to receive and disburse, under the direction of the board, all moneys belonging to the company, and to keep regular and systematic accounts of all such receipts and disbursements, and to make detailed reports of such receipts and disbursements to the directors at each stated meeting of the board. He shall cause to be deposited all moneys received by him for or on account of the company in such bank or banks as the board may select, or to make such disposition of the funds as the board of directors or the finance committee may direct; and all deposits in bank shall be entered in a book in the usual way, to the credit of the company. All checks and orders upon the funds of the company shall be drawn on the bank or institution in which the money of the company may be deposited, and such checks and orders shall be signed by the president or first vice-president or second vice-president and the treasurer; or by the president or first vice-president or second vice-president and a director to be appointed by the board; or in the absence of the president and first vice-president and second vice-president, by the treasurer and a director to be appointed by the board, and be drawn to the order of the party to whom the payment is made. However, in cases of payment for wages due persons in the employ of the company the checks drawn upon a special deposit in bank, called the isthmus draft account, shall be signed by either one of the following

persons: The president, the first vice-president, the second vice-president, the treasurer, or a director designated by the board. The treasurer shall register all transfers of stocks, and for this purpose he shall keep the account of the stock registered and transferred in such form and manner, and under such regulations as the board of directors may from time to time prescribe, and it shall be his duty to examine and audit accounts, and to attend to such other duties as may be designated by the president or first vice-president or second vice-president.

The treasurer shall also keep the dividend books and record of bonds and attend to the payment of dividends and interest money.

ARTICLE V. It shall be the duty of the secretary to be present at the meetings of the board, to keep a record of all its proceedings, and to enter the same in the minute book; to send notices to the directors of all meetings which are to be held, and attend to such other duties as may be directed by the president or the first vice-president or the second vice-president.

ARTICLE VI. All transfers of stock shall be made in the usual form, by the stockholders signing in proper person or by attorney, in a book to be prepared and kept by the treasurer for that purpose, a declaration of sale or transfer, setting forth the number of shares transferred, the person to whom and the time when the same are so transferred; and at the time of such transfer the old certificates of the shares so transferred shall in all cases be surrendered and canceled, and a new certificate shall be issued in lieu thereof.

All certificates issued shall be signed by the president or the first vice-president or the second vice-president and the secretary.

ARTICLE VII. There shall be a stated monthly meeting of the board of directors on the second and fourth Thursday of each month. A full and complete statement of the affairs of the company shall be submitted to the board of directors at any regular or special meeting held in the month of March, showing the result of the operations of the company for the preceding fiscal year ending December 31. Dividends may be declared at any meeting of the board of directors, stated or otherwise, payable at such times as the board may appoint.

ARTICLE VIII. There shall be a standing committee, to be denominated the executive and finance committee, to be composed of the president, first vice-president ex-officio, the second vice-president, and three members of the board, who shall be appointed quarterly by the president, whose duty it shall be to attend to the general management of the finances and the current business of the company during the intervals between the stated meetings of the board. The said committee shall have all the powers and exercise all the functions of the board of directors, provided always that it does not transcend the specified regulations and instructions of the board previously adopted. And the said committee shall report at each stated meeting of the board a full and explicit account of its proceedings and transactions during the month, a record of which shall be kept in proper books to be provided for that purpose. Meetings shall be held twice a week, and three members of said committee shall constitute a quorum for the transaction of business.

ARTICLE IX. All books and papers of the company shall be at all times open to the inspection of the board or any member thereof.

ARTICLE X. The order of proceedings at the meetings of the board shall be:

First. Reading of the minutes.

Second. Reports of the standing committee.

Third. Reports of select committees.

Fourth. Miscellaneous business.

ARTICLE XI. These by-laws may be amended at any meeting of the board, provided such amendment shall have been previously handed to the president in writing, and that a majority of all the members of the board consent thereto.

Senator KITTREDGE. The general office of the company is in the city of New York?

Mr. DRAKE. 24 State street, New York.

Senator KITTREDGE. Who are the directors?

Mr. DRAKE. There are thirteen directors, sir.

Senator KITTREDGE. And where do they reside?

Mr. DRAKE. The president is Mr. J. Edward Simmons, president of the Fourth National Bank. The other directors are Samuel M. Felton, president of the Chicago and Alton Railroad (he resides in Chicago, but attends the meetings); Gen. William B. Franklin is a retired general of the army, a topographical engineer (he resides in Hartford, Conn.); Mr. J. H. Parker resides in New York, and is ex-president of the Cotton Exchange and of the Bowling Green Trust Company; William Nelson Cromwell, lawyer; Vernon H. Brown, agent of the Cunard Line (he resides in New York); Mr. Charles Einsiedler, member of the banking firm of Heidelberg, Ickelheimer & Co.; Robert M. Gallaway, president of the Merchants' National Bank, a resident of New York; A. Lawrence Hopkins, ex-president of the Wabash Railroad Company and of the New York and Susquehanna Railroad, now retired; Gen. C. B. Comstock, a retired engineer of the United States Army, residing at 314 West Twenty-fifth street, New York; M. Maurice Hutin, late president of the Panama Canal Company, resident in Paris (his resignation has not yet been tendered, but we expect it will be); Mr. Xavier Boyard, who resides at 45 West Thirty-eighth street, New York, and myself, Edward A. Drake, residing at 322 West One hundred and first street.

Senator KITTREDGE. M. Boyard is the general agent of the Panama Canal Company in New York, is he not?

Mr. DRAKE. He is the commercial representative of the New Panama Company in New York.

Senator KITTREDGE. In what respect?

Mr. DRAKE. He is the corresponding agent.

Senator KITTREDGE. Does he make purchases for the company?

Mr. DRAKE. I do not know, sir.

Senator KITTREDGE. He is the general agent?

Mr. DRAKE. He is the general agent. I do not know what his duties are. I have nothing to do with the canal company. I can only give you hearsay.

Senator KITTREDGE. I wanted to identify him as the same man who has been represented here as being general agent of the canal company.

Mr. DRAKE. My only purpose was to qualify my testimony. I only give you what I know about the canal company by hearsay. He has been a member of the board ever since I have.

Senator KITTREDGE. M. Boyard?

Mr. DRAKE. Yes.

Senator KITTREDGE. And, as I understand it, he is the canal representative?

Mr. DRAKE. I have stated to you all the information I have on that subject. The executive officers of the company are: President, Mr. J. Edward Simmons; second vice-president and secretary, Edward A. Drake; treasurer, Sylvester Deming; general counsel, Sullivan Cromwell; executive and finance committee—

Senator KITTREDGE. I do not care anything about that. What is the date of your annual stockholders' meeting?

Mr. DRAKE. The first Monday in April, in accordance with the charter.

Senator KITTREDGE. And the names of all the stockholders appear on your books, also the number of shares of stock that they hold, and that you will furnish?

Mr. DRAKE. Yes; that list is on file with the Isthmian Commission, and there has been no change since then, but I will furnish it again.

Senator KITTREDGE. Are you able to give the places of residence of the stockholders, except that portion of the stock held by the Panama Canal Company?

Mr. DRAKE. Yes; we have their last address. Our communication with them is very largely through bankers. Any dividends that we pay or anything else that we send we send to their last address.

Senator KITTREDGE. You will give such information as you have on that subject?

Mr. DRAKE. Yes.

Senator KITTREDGE. Heretofore you have addressed your communications with your stockholders to their places of residence?

Mr. DRAKE. Yes. Will you let me state there that by a provision of the charter notices of the annual meeting are published regularly in the newspapers of New York at least three times before the meeting, and that is the only communication we make to our stockholders as to that; but in connection with any other matter we address them about, we have a record of their addresses, their post-office addresses.

Senator KITTREDGE. How recently have you addressed those minority stockholders?

Mr. DRAKE. Not since the last payment of dividends—in March, 1901.

Senator KITTREDGE. Have any dividend checks of the last payment been presented for payment?

Mr. DRAKE. All of the dividends have been paid except a small balance of \$198. There is an uncollected dividend account of \$198—no, they have all been paid; that was paid a few days ago.

Senator KITTREDGE. And the addresses you give will be the same as those to which you sent the checks for the last dividends?

Mr. DRAKE. Yes.

Senator KITTREDGE. You mentioned a concession from the Republic of Colombia?

Mr. DRAKE. Yes.

Senator KITTREDGE. You have that in printed form?

Mr. DRAKE. Yes.

Senator KITTREDGE. The concession to the railroad company?

Mr. DRAKE. Yes.

Senator KITTREDGE. I should like to have that as the testimony.

Mr. DRAKE. Very well. The document is as follows:

CONTRACT BETWEEN THE UNITED STATES OF COLOMBIA AND THE PANAMA RAILROAD COMPANY, MADE IN 1867, AS MODIFIED BY THE CONTRACTS MADE IN 1876 AND 1880, AND BY AMENDMENTS OF AUGUST 18, 1891.

CONTRACT REFORMATIVE OF THAT OF APRIL 15, 1850, CONCERNING THE CONSTRUCTION OF A RAILROAD FROM ONE OCEAN TO THE OTHER ACROSS THE ISTHMUS OF PANAMA.

The secretary of finance and public improvements of the United States of Colombia, duly authorized by the executive power, on the one part, and on the other George M. Totten, engineer in chief and general agent of the Panama Railroad Company, with full power and authority from the directors of said company, having in consideration the stipulation in Article II of the contract made with said company, and approved by the legislative decree of the 4th of June, 1850; and desiring to provide whatever may be needful for the perfection of the work of the said railroad, in order that it may better answer the necessities of the commerce of the world, and at the same time furnish a sure and permanent revenue to the Treasury of the Republic, have agreed to modify and re-form the said contract in the terms set forth in the following stipulations:

ARTICLE I. The Government of the United States of Colombia concedes to the Panama Railroad Company the use and possession, for ninety-nine years, of the railroad constructed by it, and which actually exists between the cities of Colon and Panama. This concession comprises not only the road, but also the buildings, warehouses, wharves, dockyards, telegraph between Colon and Panama, belonging to the road, and in general all the dependencies and other works of which the said company is now in possession, necessary to the service and development of the enterprise, and those which in the future it may establish with the same purpose.

ARTICLE II. The Government of the Republic binds itself, during the time that the exclusive privilege which is conceded to the company for the working of the railroad remains in force, not to construct for itself, nor to concede to any person or company, by any title whatever, the power to establish any other railroad on the Isthmus of Panama; and it also stipulates that, while the said privilege continues in force, the Government shall not have the power of undertaking for itself, nor permitting any person to undertake, without the concurrence and consent of said company, the opening or working of any maritime canal which may unite the two oceans across the said Isthmus of Panama to the west of the line of Cape Tiburon on the Atlantic and Point Garachine on the Pacific. But it remains stipulated that the right which is conceded to the company to give its consent does not extend to its opposing the construction of a canal across the Isthmus of Panama (except on the actual route of the railroad itself), but only to its exacting an equitable price for such privilege, and as indemnification for the damages which the railroad company may suffer by the rivalry or competition of the canal.

If the sum which may be demanded by the company shall not appear equitable to the Government of the United States of Colombia, then it shall be fixed by arbitrators in New York or Panama, one to be named by the Government and the other by the company, and in case

of their not agreeing the two shall name a third, whose decision shall be without appeal.

In pronouncing their decision the arbitrators shall take into consideration the grounds upon which the company rests, and the information which the Government shall give upon the matter, and in view thereof they shall decide without appeal as they may deem most just and equitable.

The sum, whatever it may be, which shall be finally designated shall belong one-half to the railroad company and one-half to the Government of Colombia.

ARTICLE III. In compensation of and as a price for these concessions, the railroad company binds itself to pay to the Government of the United States of Colombia \$1,000,000 in American gold, or in bills on New York payable in the same kind, as the Government may elect, on the day on which this contract shall be approved by Congress, and to pay from the present time, and until the expiration of the present privilege, an annual revenue of \$250,000^a in American gold. The company will make the payments quarterly in New York to the agent designated by the Government of the United States of Colombia, or, if the Government should desire, the company will place the money in London or Panama, the Government giving the necessary notice to the company in New York. These quarterly payments shall commence to count from the date of the approval of this contract by Congress.

From the revenue which the Government acquires by this contract there shall be set apart annually during twenty years \$25,000, which the company shall deliver to the Government of the State of Panama.

ARTICLE IV. The company binds itself to extend the railroad on the Pacific side to the islands of Naos, Culebra, Perico, and Flamenco, or other place in the bay where there may exist a permanent depth of water for large vessels.

Whereas a certain contract was made between the Government of the United States of Colombia and the Panama Railroad Company, dated the fifth day of July, one thousand eight hundred and sixty-seven, in abrogation of, and to take the place of, another contract between the same parties of the fifteenth day of April, one thousand eight hundred and fifty, which first-mentioned contract was afterwards approved by the said Government, by legislative decree, on the sixteenth day of August, one thousand eight hundred and sixty-seven, with certain modifications, which modifications were accepted by the said railroad company; and whereas it was stipulated by the said new contract, by Article IV of the same, that the said railroad company should extend its railway to the islands of Naos, Culebra, Perico, and Flamenco, or any other place in the bay of Panama where a permanent anchorage may be found for large vessels, as by reference to said contract will more fully and precisely appear;

And whereas the said railroad company has not yet completed the said work, and denies any present obligation to proceed with the same; and whereas the Congress of the United States of Colombia, on the twenty-sixth day of July, one thousand eight hundred and eighty, by an act passed on that day, authorized the Executive power of the said United States of Colombia to enter into negotiations with the Panama Railroad Company, in order to declare it liberated from the obligations it assumed by the aforesaid Article IV of the contract made on the sixteenth day of August, one thousand eight hundred and sixty-seven, for the extension of the said railway in the harbor of Panama as aforesaid, by which act a sum of money was to be paid to the said Republic of the United States of Colombia sufficient, in the judgment of the Executive power of the said Government, to compensate for the release from the said article as aforesaid;

And whereas the national Executive power of the said Government has appointed

^aTwo hundred and twenty-five thousand dollars of this annual subsidy was advanced and paid by the company to the Colombian Government in November, 1880, for the full period intervening up to March 27, 1908.

Mr. Solomon Koppel as its agent and attorney for the purpose of negotiating with the said railroad company for the abrogation of the said Article IV, and has given to him full, complete, and absolute power to enter into, carry out, and conclude, in the name of the Government of the United States of Colombia, the negotiations for the purpose of abrogating the aforesaid Article IV of the said contract;

And whereas the Chief Executive of the said Republic of the United States of Colombia has exercised the discretion conferred upon him by the aforesaid act of Congress, by the issue to the said Solomon Koppel of instructions by which the said Solomon Koppel, as such agent and attorney of the Government of the United States of Colombia as aforesaid, is directed to negotiate only for an exemption or abrogation of the aforesaid Article IV for a period of not exceeding thirty consecutive years, and has further exercised the aforesaid discretion and authority conferred by the said act of Congress by fixing the amount to be paid by the said Panama Railroad Company for the abrogation of the said Article IV, and which, by the aforesaid written instructions, is limited to the sum of ten thousand dollars per annum for each of the years during which the said Article IV is suspended or abrogated;

And whereas the said Solomon Koppel is now in the city of New York and has had a negotiation with the Panama Railroad Company touching the matters aforesaid, and has agreed with the said company to the suspension of the said Article IV for the full period of thirty years from the first day of November, one thousand eight hundred and eighty, upon condition that the said company should pay to the said Government of the United States of Colombia the full sum of ten thousand dollars per annum for each of the said thirty years, making an aggregate payment to the said Government for the suspension and abrogation aforesaid of three hundred thousand dollars in American gold, in all of which actings and doings the said Solomon Koppel has complied exactly with the written instructions of the said Chief Executive of the United States of Colombia as the same were communicated to him, and as the same have been handed by him to the Panama Railroad Company:

Now, therefore, this agreement witnesseth that, in consideration of the premises and for the aforesaid sum of three hundred thousand dollars in gold coin, payable at the rate of ten thousand dollars in each year from the execution hereof by the Panama Railroad Company to the United States of Colombia, the said Government has fully exonerated, released, and discharged, and does hereby fully exonerate, release, and discharge the said Panama Railroad Company from all its obligations of every nature whatsoever arising upon or growing out of the aforesaid Article IV of the contract of the fifth day of July, one thousand eight hundred and sixty-seven, by which article the said company was bound to extend its railroad on the Pacific side, as is provided in and by the said contract, to which special reference is hereby made, and the said contract, in so far as concerns the extension of the said railroad into the bay of Panama aforesaid, is hereby, in accordance with the full power granted to the Chief Executive of the said Government by the Congress of the United States of Colombia, abrogated and annulled. But this abrogation, suspension, and annulment of the said Article IV shall continue only for the period of thirty years from and after the first day of November in the year one thousand eight hundred and eighty, and at the expiration of the said term of thirty years the said Article IV of the said original contract of the fifth day of July, one thousand eight hundred and sixty-seven, shall again be revived, and shall be and remain thereafter in force and effect as the same now exists. And the said Panama Railroad Company, in consideration of the aforesaid suspension, release, and abrogation of the said Article IV for the term and period as aforesaid, hereby agrees to pay to the said Government of the United States of Colombia the just and full sum of three hundred thousand dollars in gold coin as follows, viz: The sum of ten thousand dollars on the first day of November in each and every year, payable in the city of New York, during the said term of thirty years, the first of said annual installments to be payable on the first day of November, which will be in the year one thousand eight hundred and eighty-one, and on each first day of November thereafter until the whole sum of three hundred thousand dollars shall have been paid. And it is further provided and agreed that in case the said Panama Railroad Company or its successors shall determine to extend its said line of railway to the islands in the bay of Panama, or to deep water in accordance with the terms of said Article IV as originally agreed, and shall actually construct the same, that then and from thenceforward the annual payment of ten thousand dollars for each of said thirty years shall cease for the remainder of said term then unexpired, anything herein contained to the contrary in anywise notwithstanding; but this termination of said annual payments shall not take effect until the expiration of six months after said Panama Railroad Company shall have given notice to the Government of the United States of Colombia of the actual completion of said extended line in the bay of Panama as aforesaid.—[Contract of 1880.]

ARTICLE V. During the whole term of this privilege the company shall have exclusive right to establish across the Isthmus of Panama, within the zone indicated in Article II, any class of carriage roads whatever from one ocean to the other. The Colombian Government binds itself not to undertake for itself, nor to permit any other company or person to undertake within said zone, any other carriage road, either macadamized, or of plank, or of any other class suitable for the use of wheeled vehicles, between the two oceans across the Isthmus of Panama. It being nevertheless well understood that the privilege of which this article treats can not and must not in any manner prevent the construction of any kind of roads in a direction distinct from that expressed, nor the completing, preserving, and improving of roads already existing, or which are actually being constructed on said Isthmus.

ARTICLE VI. The company shall have the right for the whole term of this privilege:

First. To regulate and direct the use of the ports, embarking and disembarking places, wharves, anchorage grounds, etc., at the termini of the railroad, and to establish agents with powers to carry into effect the regulations that it may make in this particular in conformity with the laws of the Republic. These regulations should be submitted to the approval of the executive power, without which they can not take effect. The executive power may refuse its approbation, alter, and revoke them as it may deem convenient.

Second. To use the embarking and disembarking places, wharves, etc., that it has constructed or may construct in the ports situated at the two extremes of the road.

Third. To use the landings necessary, and especially those designated for the storage and free deposit of all goods and merchandise admitted for transit over the Isthmus on the railroad constructed by the company. By virtue of this privilege the company may collect as compensation for the use of the line of communication, means of transportation, landings, warehouses, and establishments of all kinds belonging to it such tolls for transporting, wharfage, storage, and labor as it may deem proper to establish.

The company continues in the exercise of all the rights conceded to it in the sixth article of the contract of fifth of July, eighteen hundred and sixty-seven. Consequently it may regulate and direct the use of the ports, embarking and disembarking places, wharves, anchorage grounds, and so forth, at the termini of the railroad, and establish agents with powers to carry into effect the regulations that it may make in this particular in conformity with the laws of the Republic. These regulations shall be submitted to the approval of the executive power, without which they can not take effect; but the executive power, after having once approved them, cannot change them nor revoke them without the consent of the company.—[Art. I of contract of 1876.]

ARTICLE VII. The executive power shall determine the forms to be observed in the landing of goods on either ocean, and the intervention therein of the officers of the Republic to prevent the effects destined for transit from one ocean to the other from being left on the way or fraudulently introduced for internal consumption. Said precautions shall be such as may tend to prevent all frauds to the injury of the public revenue, without delaying or embarrassing the rapid dispatch and transit of passengers and packages of merchandise, luggage, and goods of all kinds which may be subjects of lawful commerce.

ARTICLE VIII. The company may give to the actual railroad a different direction from that which it now has, and which it may deem

most favorable to the enterprise, it being free to choose the points of departure and arrival which may appear to it most advantageous and most convenient for the entrance and anchorage of vessels, or for ports properly so called, and for embarking places, dry docks, places for lighterage, landings, warehouses, stations, hotels, and establishments of all kinds, and this without prejudice to what is stipulated in Article IV of this contract.

ARTICLE IX. The Government of the United States of Colombia ratifies the concession made to the Panama Railroad Company by the contract of the 15th of April, 1850:

First. Of the lands that it has required and that it may require for the establishment of the line of railway in its whole extent, provided such lands belong to the Government.

Second. Of the lands which were necessary for seaports, dry docks, river ports, landings, embarking places, places for lighterage, warehouses, stations, hotels, and generally for all the necessities of the service of the railroad, always provided that such lands shall be the property of the Republic.

Third. Of the concession made by gratuitous title and in perpetuity of 64,000 hectares of vacant lands in the territory of the State of Panama, with exception of the islands in both oceans and of the districts which formed on the 1st of January, 1849, the territories of "Bocas del Toro" and of "Darien," limits of which were fixed by the law of the 9th of January, 1855. This concession may be extended to 96,000 hectares if there shall be that number disposable within the limits of the ancient provinces of Panama and Veraguas in such manner that the Government can adjudicate them as vacant lands; and the company shall have the right to select them in the continental part of said provinces as they may deem most convenient. But it is stipulated that in the lands which the company may select on the line of road and its vicinity, there shall positively be left regular intervals equivalent in extent to those (tracts) which shall be given to the company in order that the Government may be enabled to make grants or sales of land for other establishments which may desire to locate themselves on the line and in the neighborhood of the road.

Paragraph. The lands granted to the company by sections 1 and 2 of this article shall be returned to the Republic at the expiration of the present privilege in the terms and with the formalities prescribed in this contract.

ARTICLE X. In the grant of vacant lands in perpetuity made to the company by the contract of 1850 and ratified in section 3 of Article IX of this contract, there is not included the number of hectares contained in the island of Manzanillo in the bay of Limon, but they are included in the grants treated of in the first and second sections of the article cited, with the exception of 4 hectares which the Government reserves as an area for the construction of buildings for public offices, schoolhouses, prison, and other objects of public use, which shall be delivered by the company properly graded and in condition for building upon them. But it is understood that in the designation by the Government of the place or places in which it desires to take the 4 hectares reserved to it by this article, it shall not choose those which may be necessary for the construction and service of the railway and its dependencies, nor those which may be already occupied by buildings now standing or which are to be reconstructed.

This selection may be made by the Government in anticipation, as

it may see fit, in accordance with the plan of the city, in order that the lands may be delivered to it so soon as the nature of the ground permits of the grading being carried on.

ARTICLE XI. The lands conceded to the company by Article IX, section 3, shall be delivered as may be requested on compliance with the legal formalities established for such cases, and it being incumbent on the company to prove their character as vacant lands, to measure them, and to make the respective plans. The adjudication of said lands shall be made by the executive power, and from the time the declaration is made in the premises they shall be considered definitely adjudicated to the company; but the provisional adjudication shall be made by the President of the State of Panama, submitted always to the examination and approval of the national executive power, and while not disapproved it will only produce the effect of preventing any ulterior grant of the same lands in favor of a third party. The Republic is not bound in any case to the vacating and guaranteeing the title of the vacant lands which may be adjudicated to the company.

The executive power will fix a time in agreement with the company within which the latter shall be bound to designate the vacant lands to which it has the right.

ARTICLE XII. When the lands which may be required for the extension of the line of the railroad, as referred to in Article IV of this contract, or for changes of direction of the line, or for the establishment of a second line of rails, shall be the property of private individuals, the company shall have the right to obtain them on an official appraisal and the just indemnification of the proprietor, in conformity with the dispositions of the law of the 22d of May, 1866, "concerning the mode of proceeding in those civil cases the cognizance of which appertains to the tribunals of the Union."

ARTICLE XIII. The railroad enterprise is esteemed of public utility.

ARTICLE XIV. The company is authorized to propose to the executive power the regulations which it may judge proper for the police, security, and preservation of its ways of communication, ports, works, and establishments of all kinds; but such regulations shall not be put in force without the express approval of the executive power, which even after having approved them may amend or annul them as it may deem proper, proceeding always in conformity with the laws of the Republic.

The company continues authorized to propose to the executive power the regulations which it may judge proper for the police, security, and preservation of its ways of communication, ports, works, and establishments of all kinds.

Such regulations shall not be carried into effect without the express approval of the executive power; but the latter, after having approved them, can not change them nor annul them without the consent of the company.—[Art. II of contract of 1876.]

ARTICLE XV. The tariff of charges and freights on money, carriage of merchandise, and transport of travelers over the railroad, board and storage in the depots and establishments of the company, shall be fixed by it, and modified as it may deem best for its interests, but it shall be bound to inform the local authorities of said tariffs and modifications with at least thirty days' previous notice.

ARTICLE XVI. The company binds itself to transport gratis over the railroad the national and State mails that may have to be carried from ocean to ocean or to any intermediate point; and it may make

such pecuniary arrangements as it thinks proper for the transportation of foreign mails, the passage of which over the Isthmus is declared free to all nations; but the Government of the Republic may prohibit the passage by the railroad of the mails of those nations that may be at war with it, in which case the company shall refuse to carry them over the railroad.

ARTICLE XVII. The company may freely introduce into the Isthmus without payment of duties or imposts of any kind all the implements, machines, tools, materials, provisions, and manufactured articles intended for the construction, working, and preservation of the railroad, and the provisioning of the workmen employed on it.

ARTICLE XVIII. The company is exempt from paying taxes or contributions national, municipal of the State, or of any other kind upon the railroad, its warehouses, wharves, machines, or other works, things, and effects of any kind belonging to it, and which in the judgment of the executive power are necessary for the service of the said railroad and its dependencies.

ARTICLE XIX. In compensation for these exemptions, the company binds itself to transport gratuitously, and without the Government having to pay anything either for freight or for any other cause, the troops, chiefs, and officers, and their equipage, ammunition, armament, clothing, and all similar effects that may belong to, are, or may be destined for the immediate service of the Government of the Republic, or of the State of Panama, as also their officials in service or in commission, and those individuals who with their families and baggage may come to the country in the character of emigrants and of new settlers, with the permanent character of such for account of the Government, up to the number of 2,000 annually. The executive power shall dictate the provisions as it may deem proper in such cases, in order to prevent those passengers whose entry into Colombian territory may be purely accidental from availing themselves of this concession.

The executive power of the Union shall dictate the provisions which may be necessary, at the request of the company, to prevent abuses in the gratuitous passage which Article XIX of the aforesaid contract concedes to national employees and those of the State of Panama.—[Art. IV of contract of 1876.]

ARTICLE XX. Colombian productions shall be transported by the railroad during the first twenty years of this contract, paying only one-half the rates of freight or transportation previously fixed by the company for foreign products of the same class, but this term being concluded they shall pay a charge or freight not exceeding two-thirds of that previously fixed in the tariff of the company—tariff rates which the company can not increase in future in regard to Colombian productions.

[See amendments of August 18, 1891.]

In order that Colombian products may be transported by the railroad under the conditions of Article XX, of the same contract, there must precede a declaration of the shipper, duly attested by the bill of lading of shipment, with a certificate of the administrator of the national treasury at the port of shipment, or other similar document, at the time of offering them, that such products are really Colombian; a necessary condition, without which there shall be no ground for any claim.—[Art. V of contract of 1876.]

ARTICLE XXI.—Passengers, money, merchandise, objects, and effects of all kinds destined for interoceanic transit over the railroad, while they remain in the warehouses and depots of the company, or in its

possession, are exempt from dues and taxes, national, municipal of the State, or of any other description. In like manner the vessels which may enter the ports at the termini of the railroad, as well as their officers, crews, and their agents, shall be exempt from the payment of tonnage dues, or of any other tax or contribution whatever on account of service applied directly to the interoceanic transit.

ARTICLE XXII. Travelers passing from one sea to the other over the railroad shall not require any passports to pass over it, excepting in cases of foreign war or internal commotion, when the Government may deem the presentation of passports expedient for the security of the country or the preservation of public order. Nevertheless, persons who have been expelled from the territory of the Republic, or other individuals whom the laws forbid an entrance into the country, shall not pass over the railroad.

ARTICLE XXIII. In case the present privilege conceded to the company shall be declared forfeited by the competent tribunal, it shall return to the Republic such lands granted in ownership and by gratuitous title as may not be already transferred in fee to a third party, and it shall have no right to exact any indemnification for improvements nor for any other cause.

ARTICLE XXIV. It is obligatory upon the company to make a survey of the lands, with notice to the owners of adjoining lands, and to make a topographical plan of the road, with all its dependencies, such as bridges, aqueducts, viaducts, and other works which it may have constructed for the service of the railroad, in order that by means of such plan it may be clearly known what the company holds in ownership, and to what purpose the exemptions provided for are destined.

ARTICLE XXV. The company binds itself to execute constantly, with all care, punctuality, and celerity, the transportation of the travelers, cattle, merchandise, goods, and materials of all kinds that may be confided to it, payment being made of the charges and prices of transportation that may be fixed in the respective tariff. The disposition of this article is, nevertheless, no obstacle to the company's entering into special contracts for the transportation of articles whose bulk, weight, or exceptional nature do not allow of their freights being fixed beforehand.

The provision of the final part of Article XXV of the aforesaid contract of 1867, by which the company was permitted to enter into special contracts for the transportation of articles whose bulk, weight, or exceptional nature would not allow of their freights being fixed beforehand, is made applicable to all kinds of articles of commerce. (Art. III of contract of 1876.)

ARTICLE XXVI. Vessels of nations which may be at war with the United States of Colombia shall not be admitted to the ports situated at either extremity of the railroad, nor shall the productions, effects, and property of such nations enjoy the free transit of the Isthmus over the said road.

ARTICLE XXVII. It is obligatory upon the company to maintain constantly in Panama or Colon a representative with sufficient power and authority to treat, whenever it may be necessary, personally with the Government on matters having relation to the enterprise.

ARTICLE XXVIII. The present privilege can not be ceded or transferred to any foreign government; that is to say, to any government existing outside of Colombian territory, under pain of forfeiture of the said privilege by the mere act of attempting or verifying such

cession or transfer, which act, from the present time, is declared absolutely null and of no value or effect. This privilege shall also be forfeited in case the railroad company shall not execute the transportation during a period exceeding four consecutive months (fortuitous cases excepted).

This privilege will also be forfeited by the failure of payment, after being one year overdue, of any of the quarterly payments. Delay in the payments for a less period subjects the company to the payment of interest at the rate of 7 per cent per annum.

None of the cases of forfeiture of the privilege fixed in Article XXVIII shall go into effect until the resolution of the Government, in which the declaration of forfeiture is made, is served in due form, and at least three months in advance, on the company and on the agents of the persons to whom the Government may transfer or hypothecate the revenue to which it is entitled by Article III, if said transfer or hypothecation shall have taken place; it being understood that if, after the notification has been given, and during the aforesaid three months, the company, or the interested persons, of whom mention has been made, shall satisfy the Government, causing the reason for complaint or forfeiture to disappear, the said declaration shall not be carried into effect. (Art. VI of contract of 1876.)

The Government reserves to itself the right to hypothecate, in whole or in part, the revenue, of which mention has been made in Article VI of this contract (except the right of the State of Panama to the annual proportion of \$25,000), before the time at which said revenue is to be paid, and whatever may be hypothecated shall be payable in such a manner as the Government may direct; and the railroad company binds itself, on being notified of any transfer or hypothecation, to accept it and to make payment at the maturity of the installments to the persons or parties in whose favor the transfer or hypothecation may have been made. (Art. VIII of contract of 1876.)

ARTICLE XXIX. In case of the forfeiture of this privilege from any cause, the ownership and full possession of the railroad, with all its dependencies, appurtenances, and accessories, shall pass to the Republic without the company's having thereby any right to indemnification or remuneration of any kind.

ARTICLE XXX. The Government of the Republic binds itself to protect and maintain in all their integrity the rights of the company resulting from the present contract, provided the company complies punctually on its part with the duties and obligations which it undertakes, and that the privilege continues in force.

ARTICLE XXXI. The right which said Republic reserved to itself by the contract of the 15th of April, 1850, to redeem the privilege of the company, being especially hypothecated as an additional security for the loan contracted by the said Republic in London under date of the 1st of October, 1863, it is stipulated that the products from the railroad, which by this contract belong to the Government, remain subsidiarily applicable to the payment of the obligations of the Government of the Republic, in regard to that loan, whether it be to complete the annual installments which the Government is obliged to pay in London on account of the interest and amortization of the capital, or to redeem the bonds of the loan at par, if in 1874 their redemption shall not have been completed.

ARTICLE XXXII. In consequence of the stipulation in Article III, the Government renounces the benefit or participation of 3 per cent which by Article LV of the primitive contract it had in the net products of the enterprise, and the quota of 5 per cent which had also been reserved in its favor by Article XXX of said contract in the transportation of correspondence, and which quota it was stipulated should not be less than \$10,000 annually. The account of these profits

shall be liquidated immediately in the terms fixed by Article LV, up to the day on which the present contract begins to rule and have effect, and the payment of the balance which may result in favor of the Republic shall be made by the company in New York to the order of the Government.

ARTICLE XXXIII. Questions which may arise between the Government of the Republic and the railroad company concerning the understanding or the fulfillment of this contract shall be decided by the courts and tribunals of the Colombian Union, according to the constitution and laws of the Republic.

Questions that may arise between the Government of the Republic and the railroad company as to the understanding or the execution of this contract, and of those of 1850 and 1867, to which this one refers, shall be decided without appeal by the federal supreme court of the Colombian Union, without the intervention of any other tribunal. (Art. VII of contract of 1876.)

ARTICLE XXXV. The ninety-nine years of the duration of the privilege conceded by this contract shall be counted from the date on which it may be approved by the Congress.*

ARTICLE XXXVI. At the expiration of the term of the privilege, and by the sole fact of its expiration, the Government of the Colombian Union shall be substituted in all the rights of the company and shall enter immediately into the enjoyment of the line of communication, of all its fixtures, of all its dependencies, and of all its products. The company shall be bound to deliver to the Government, in good order, the roads, the works which compose them, and their dependencies, such as landing and discharging places, offices, machines, and in general whatever movable or immovable objects, whether destined for the especial service of transportation or applicable to any other object connected with the enterprise.

ARTICLE XXXVII. The present contract contains all the concessions and privileges which the existing Panama Railroad Company has acquired for the future. In virtue of which it is declared, and the parties hereby expressly agree, that at no time can the company claim rights or privileges which are clearly not contained in this contract, unless they may be granted by subsequent acts.

ARTICLE XXXVIII. The contract of the 15th of April, 1850, approved by the legislative decree of the 4th of June of the same year, is hereby reformed by the terms of the present contract, and extended as it is in thirty-eight articles it shall be submitted to the approval of the executive power of the Republic, and when obtained it shall be presented to Congress, the consent of which is required in order that, being enacted into a law, it may be carried into effect.^b

AMENDMENTS AGREED UPON BETWEEN THE PANAMA RAILROAD COMPANY AND THE
REPUBLIC OF COLOMBIA, AUGUST 18, 1891.

ARTICLE I. Article XX of the contract of July 5, 1867, approved by law No. 46 of the same year, shall read as follows:

“From and after July 1, 1892, Colombian products passing over the Panama Railroad shall pay only half of the rate of freight established by the company for foreign products of the same class.”

* Which was August 16, 1867.

^b Congress approved August 16, 1867.

ARTICLE II. Salt from the Colombian salt pits of the Atlantic coast intended for the national ports of the Pacific shall be transported by the same railroad company at the following rates:

A quantity not exceeding 6,000,000 kilograms each year, and which shall in no case exceed 1,000 tons per month, at the rate of \$2 gold per ton without any deduction. Shipments of the salt referred to that may exceed the quantity above stated shall pay the rate that is established for the Colombian products in the previous article.

Senator KITTREDGE. Have you frequently visited the property at Panama?

Mr. DRAKE. The general manager has.

Senator KITTREDGE. Have you any knowledge of the physical condition and value of the properties connected with the railroad company property beside what appears upon your books?

Mr. DRAKE. We have and always have had a regular weekly mail communication and report from the general superintendent who is there, and Mr. Paine goes down every year and makes his report. Those reports are our records.

Senator KITTREDGE. You have in the books of your office some statements or books showing the value of the property as it appears in that way, have you not?

Mr. DRAKE. Yes; I have the capitalization account.

Senator KITTREDGE. That is what I refer to, the capitalization account.

Senator KITTREDGE. Will you give that?

Mr. DRAKE. It approximates \$13,000,000, but I can give it to you exactly.

Senator KITTREDGE. I wish you would, and give the items of which that amount is made up.

Mr. DRAKE. Yes.

Senator KITTREDGE. The value of the road and its properties?

Mr. DRAKE. Yes.

The CHAIRMAN. I wish you would include a copy of the account, showing houses, hospitals, etc., that the railroad has. I want to keep the hospitals, houses, and the like of that, which the canal company has, separate from those of the railroad company.

Mr. DRAKE. I can only supply this accurately by sending to the Isthmus for a correct list, which I shall do. I want to say that in the capitalization account no valuation is given to the land grants.

Senator KITTREDGE. I will take that up a little later.

The capitalization account referred to is as follows:

Capital account.

Cost of road and equipment:

Construction	\$8, 232, 438. 47
New contract	*1, 265, 503. 69
Terminal at La Boca	2, 148, 303. 69
Water tank and pipes to connect Monkey Hill Reservoir	3, 464. 81
Floating pile driver	7, 428. 03
Electric-light plant (Colon)	10, 055. 19
Ice plant (Colon)	6, 792. 70
Dredging attachment for floating pile driver	1, 083, 34
	<hr/> \$11, 675, 069. 92

* Vide Article III, amendment of contract in 1867.

Real estate at Isthmus:

Aspinwall lands.....	\$100,000.00	
Panama lands.....	125,862.79	
Isthmus lands	25,631.05	
Interest in Panama Islands	14,622.90	
		<hr/>
		\$266,116.74

Floating equipment:

Steamers <i>Allianca</i> , <i>Finance</i> , and <i>Advance</i>	370,169.27	
Less depreciation fund.....	102,750.00	
	<hr/>	
	267,419.27	
	<hr/>	
Tugs and lighters.....	354,395.13	
Less depreciation fund (tugs)	10,500.00	
	<hr/>	
	343,895.13	
		<hr/>
		611,314.40

Total capital account 12,552,501.06

New York, March 7, 1902.

Mr. DRAKE. The grant of lands along the line of the road stands as a separate grant, and although it amounts to 136,000 or provisionally 204,000 acres it has not been taken up, and no valuation is given to that in our statement. The lands have not been located. They may be at any time. They are out in the virgin forest. We have our right to locate them, and all that comes to us by gratuitous title will remain the property of the railroad unless the concession is forfeited for violation of its terms, and even if it is, then all property that has passed into the hands of third parties is exempt from sequestration.

The CHAIRMAN. And the balance reverts to the Government?

Mr. DRAKE. Yes.

Senator KITTREDGE. What is the date of that concession?

Mr. DRAKE. The original concession was in 1850. It has been amended in 1876, and in 1880, and in 1891. The copy which I have left with you contains all the amendments.

Senator HARRIS. Was there not an amendment in 1867?

Mr. DRAKE. Yes; there was one that was made in 1867.

Senator HARRIS. And the final amendment was in August, 1891?

Mr. DRAKE. August 19, 1891.

Senator HARRIS. The contract as modified by the subsequent amendments covers the contract as it is in existence now?

Mr. DRAKE. Yes.

Senator KITTREDGE. What items go to make up your capitalization account as you keep your books?

Mr. DRAKE. The cost of the road there—

Senator KITTREDGE. Will you give the amount?

Mr. DRAKE. I have them for 1900, \$11,435,000. Rolling-stock equipment, and I would say that the cost of these three vessels mentioned here is reduced in this statement. There is a depreciation regularly taken into account for each year.

Senator KITTREDGE. I want it just as you have it on your books.

Mr. DRAKE. \$267,419.27. That is the way it stands on the books. The cost of the tugs and lighters on the books as reduced is carried in 1900 at \$345,995.13, making up an aggregate of \$12,148,199.22.

Senator KITTREDGE. When were those boats purchased?

Mr. DRAKE. In 1893, sir.

Senator KITTREDGE. And the amount that you mentioned as put in there as the present value?

Mr. DRAKE. The present cost. They are very much more valuable than that.

Senator KITTREDGE. In the first item that you gave is included, I suppose, the construction of your terminals?

Mr. DRAKE. All constructions?

Senator KITTREDGE. At Panama?

Mr. DRAKE. The statement that I give you for 1901 includes the cost of the construction at La Boca. That was not carried to capital account until December 31, 1901. The actual cost had not been ascertained.

Senator KITTREDGE. For the purpose of this examination, taking this capitalization account of December, 1900, you have there something like \$12,000,000?

Mr. DRAKE. Yes, sir.

Senator KITTREDGE. Of which there is something like \$11,000,000 for your construction, on your construction account?

Mr. DRAKE. Yes.

Senator KITTREDGE. And that includes the roadbed, the ties, the rails, the terminals, the station houses, the equipment, and what else?

Mr. DRAKE. Everything, sir; the wharves on the Colon and Panama sides, the hospitals, reservoirs, and all the appurtenances; the company's quarters and residences in Colon, and all the appurtenances of the railroad company, freight houses, passenger stations, turntables, shops, and all those things.

Senator KITTREDGE. And in addition to that have you charged in that fund ties and rails to be used?

Mr. DRAKE. No, sir; we have no stock on hand.

Senator KITTREDGE. How do you carry that account?

Mr. DRAKE. It is charged to the railroad, and it is carried in the operating expense account.

Senator KITTREDGE. That is carried in your operating expenses?

Mr. DRAKE. Yes; the cost of maintenance. It is charged out to the different departments; charged to the supply account and issued to the different departments and carried in the expenses of those departments, and from that into operating expenses.

Senator KITTREDGE. Does your report for 1901 show a material difference from your report for 1900 except so far as the improvement at La Boca is concerned?

Mr. DRAKE. It shows a comparatively large expense for maintenance and improvement of the road, betterment of the floating equipment and of the road itself, in addition to the cost of the construction of the pier.

The CHAIRMAN. Do you include betterment in your estimates of the cost—

Mr. DRAKE. That goes to the betterment account. That was for improvements calculated to last for four or five years that we apportioned to operating expenses during those years. That does not enter into the capitalization account.

Senator KITTREDGE. Where does the expense of the construction of the pier at La Boca appear on your books?

Mr. DRAKE. That is construction account and will be carried to the capital account as of date December 31, 1901.

Senator KITTREDGE. So that in addition to what you have here in 1900, there are \$2,000,000, the cost of constructing the La Boca pier, to be added?

Mr. DRAKE. Yes; that is the additional cost over \$1,660,629.07, shown in 1900, up to \$2,148,303.69. All of the expenses incident to that pier since January 1, 1902, are carried to operating expenses.

Senator KITTREDGE. Now, what about the wharves and the terminal facilities and houses you have mentioned at Colon?

Mr. DRAKE. The company has a large plant there, its residences, its hospitals, its reservoirs, its dormitories, its employees' quarters, its shops, and its wharves. It has 4 large wharves there which it owns in fee. Here is a map which shows the property, and in addition it is the landlord of all these lots. All of the active part of Colon, all of the residences and business portions of Colon, is along the line of the railroad, and it is the property of the railroad. The property is held under lease, in modern American form, for five years, at an annual rental which is regularly collected and at the end of that lease, if it is not renewed, the property that has been put on has to be appraised and acquired for the railroad; but in a large majority of cases that is our abundance.

Senator KITTREDGE. In what shape is the title of the Panama Railroad Company to this property you have just described?

Mr. DRAKE. It is covered by the concession, sir. The right of ownership is confirmed.

Senator KITTREDGE. This is true of all its property?

Mr. DRAKE. Of all its property; yes. At the time of the amendment to the concession, in 1867, the right and title of the Panama Railroad to all of its property was confirmed.

Senator KITTREDGE. Now how about your hospital at Colon?

The CHAIRMAN. Before you come to that, have you bought any property from private persons—have the railroad company bought any property from private persons?

Mr. DRAKE. No, sir. No; going away back to the origin, we have acquired rights of way sometimes by purchase outright, but any individual rights that we acquired fifty years ago are now the property of the railroads. We have acquired nothing since from individual property, except in 1867 we bought out some associate owners of Manzanillo Island, and from 1853 to 1890 we have purchased from individuals lands in and about Panama valued at \$125,800.

The CHAIRMAN. You acquired this right of way by purchase or by consent or by condemnation.

Mr. DRAKE. Yes; the entire property that we hold now is held in the way I stated, except a very small portion which we hold by leasehold from the canal company; but that is all covered by leases during the life of our concessions.

The CHAIRMAN. All the property practically that you have got there that is not a part of the railroad is obtained under these concessions?

Mr. DRAKE. Yes.

Senator KITTREDGE. How extensive are your shops?

Mr. DRAKE. Ask Mr. Payne; he has visited them. I should like Mr. Payne, as the operating officer in direct charge of that, to answer those questions. The skilled labor that we employ is all sent from here, and they are capable of making any repairs. All our steamers are repaired down there when necessary. Repairs of that kind are effected at both ends. In fact, there are provisions in our contract with other companies to do their work of that kind.

The CHAIRMAN. How many houses and lots does the railroad company own that are improved and under lease to private persons?

Mr. DRAKE. There are over a hundred, sir. They are leased along the line of the railroad in Panama and Colon. The number of lots runs up into the thousand, I think.

The CHAIRMAN. Houses built by the railroad company?

Mr. DRAKE. Yes; in Colon thirty-three houses built as quarters and rented to our employees, some furnished and some partly furnished.

The CHAIRMAN. They are put into the capitalization of the company?

Mr. DRAKE. Yes.

Senator KITTREDGE. Can you tell us more of that concession that you have?

Mr. DRAKE. Yes. The concession, by the original clauses, after stating all of our rights, articles 9, 10, and 11 of the concession refer particularly to land grants.

Article 9 confirms and ratifies the concession made to the railroad company by the contracts of the 15th of April, 1850. Then it goes on to subdivide the lands. The lands that we are to take up in alternate sections, and to which we acquire the title in fee, those are referred to as gratuitous-titles lands. The company reserves to itself the right to take up alternate sections, as is done in the United States, and then it provides that concessions made by gratuitous title in perpetuity of 64,000 hectares—a hectare is 2.47 acres, very nearly 2½ acres, which would make that about 150,000 acres—may be taken up in the State of Panama.

Later on it provides that that concession of 64,000 hectares may be extended to 96,000 hectares in the States of Panama and Veraguas and the adjoining continent, in such manner as the Government can adjudicate them as vacant lands, and the company shall have the right to select them in the continental part of said provinces as they may deem most convenient. That is, provided there are that number of hectares that can be found in the two departments that are desirable for the railroad company, it has the right to take them up to that number. Then, later on, it provides that in case of the expiration of the concession the land that has come to the railroad company by the gratuitous title remains its property in fee; but in case of a violation and forfeiture of the contract, these gratuitous title lands, except such as have been conveyed to third parties, revert to the Republic of Colombia.

Senator KITTREDGE. Are the title papers to the property you have mentioned in your office?

Mr. DRAKE. All a matter of record. I have our deed.

Senator KITTREDGE. Does the title to all the property stand in the Panama Railroad Company?

Mr. DRAKE. Yes; it is recorded both in the courts of Colombia and here, and is a matter of record in both places.

Senator KITTREDGE. Do the directors or stockholders own any property in Colon, or on the western coast, or on the line of the railroad?

Mr. DRAKE. None whatever, sir.

Senator KITTREDGE. So that they have no private interests connected with this railroad company?

Mr. DRAKE. Except stock.

Senator KITTREDGE. I was going to ask, except as stockholders?

Mr. DRAKE. That is all, sir.

Senator KITTREDGE. And that is true of the directors as well as the stockholders?

Mr. DRAKE. Absolutely.

Senator KITTREDGE. Have you any knowledge of the traffic arrangement of your company, including the traffic on the steamboats as well as the railroads?

Mr. DRAKE. We have traffic arrangements. I have testified that we have those arrangements.

The CHAIRMAN. He has gone very fully into that and he will give us copies of the traffic agreement.

Mr. DRAKE. Only with two companies on the other side, sir. I give these as examples of traffic contracts, but we have working arrangements with the eight lines that converge at Colon, and all of these agreements are terminable upon ninety days' notice.

The CHAIRMAN. You have furnished a sample copy?

Mr. DRAKE. Those are the contracts that we have with the companies on the Pacific side, sir. We have working arrangements with all those lines, that are made by exchange or correspondence, perpetuating the working arrangements under which they are operating. Some of the contracts have been running for thirty or forty years, and have become almost dead letters. They were all canceled, and the existing practices continued, by working arrangements that are now effective, and terminable upon ninety days' notice from either party at any time.

The CHAIRMAN. But I wish to ask you whether you have not given us a copy of a sample contract?

Mr. DRAKE. Of the contract we have with the two Pacific companies, on the Pacific side. We have no such contracts with people on the other side.

The CHAIRMAN. Are they alike?

Mr. DRAKE. In effect they are substantially alike.

The CHAIRMAN. You gave me this copy here to go into the record. Is it substantially the same as the contract that you have on the Atlantic side?

Mr. DRAKE. Yes.

The CHAIRMAN. I want to make that clear. This contract that is put in the record here between the Panama Railroad Company and La Cia. Sud-Americana de Vapores, dated March 20, 1901, and marked "Exhibit A," in substance, is the same traffic arrangement you have with these various lines of steamers of which you have spoken, on the Atlantic side.

Mr. DRAKE. Yes; except that in that contract there are a good many clauses that relate to the delivery of cargoes that are peculiar to the Pacific side, to the terminal there.

Mr. PAINE. We have lighterage on one side, and at Colon they come right to the wharves.

Senator KITTREDGE. Has your company any traffic or pooling arrangement with any transcontinental line?

Mr. DRAKE. None whatever, sir.

Senator KITTREDGE. Have you any other traffic arrangements with any transportation company than is stated here in your testimony?

Mr. DRAKE. No, sir; meaning the lines that connect with us at Colon

and the lines that connect with us at Panama. We have no other contract.

Senator KITTREDGE. And those you have mentioned in your testimony?

Mr. DRAKE. Yes.

The CHAIRMAN. Up to a recent date you have had a traffic arrangement with the Pacific Mail Steamship Company on the Pacific Ocean?

Mr. DRAKE. Up to December, 1900, we had a contract that was made in December, 1895, with the Pacific Mail Steamship Company. Since that time we have had no contract with the Pacific Mail.

The CHAIRMAN. I wanted to know if you could state to me or to the committee how much money has been expended by the railroad company in the purchase of ships?

Mr. DRAKE. Three hundred and seventy thousand dollars was expended, approximately—within a few hundred dollars of that—for the purchase of the three ships now operating on the Atlantic side.

The CHAIRMAN. Are they new ships or old ones?

Mr. DRAKE. They were the ships of the old Brazil Mail Line Steamship Company.

The CHAIRMAN. Steamers?

Mr. DRAKE. Yes; they were steamers. They are very substantial steamers. They were built by John Roach. They are 18 or 19 years old. They are maintained in perfectly efficient condition to-day. They have run regularly since we put them in operation in 1893 to and from Colon, operated by the company, and my estimate of their value is in excess of others, because I know what it would cost if we had to buy them to-day. If we had to buy them to-day we would have to pay \$250,000 apiece for them. We bought them at a great bargain, when they were being sold under a mechanic's lien, and at the time we bought them there was a certified check for \$100,000 more than we paid for them, to take them up if we had not.

The CHAIRMAN. The betterments and repairs on these ships, of course, have gone into these accounts for operating expenses of the railroad?

Mr. DRAKE. Yes; they are operated as an adjunct to the railroad.

The CHAIRMAN. They are operated as a part of the railroad?

Mr. DRAKE. Yes; but they are under American register and are domiciled in New York. They do not relate to the concession in any way.

The CHAIRMAN. They were domiciled by a special act of Congress, were they not?

Mr. DRAKE. They are American built; built by John Roach.

The CHAIRMAN. I have no further questions that I wish to ask you. If there is anything further you would like to state, you can do so.

Mr. DRAKE. No, sir. I have nothing to volunteer, except in reference to the distinct autonomy of the company's property. The autonomy of the company, the physical condition of its property, and its financial condition, all of which, from my standpoint, are par excellent.

Senator KITTREDGE. And of the physical condition the general manager knows more than you do?

Mr. DRAKE. Yes; because he has its care.

STATEMENT OF MR. CHARLES PAINE.

The CHAIRMAN. What is your residence?

Mr. PAINE. Tenaflly, N. J., is my home. My office is in New York City.

The CHAIRMAN. How long have you been connected with the Panama Railroad Company, and in what capacity?

Mr. PAINE. As general manager, since May, 1899.

The CHAIRMAN. Where has been your residence during that period?

Mr. PAINE. As I have stated here. My office has been in New York and my residence in Tenaflly, N. J., one of the suburbs.

The CHAIRMAN. During that time you have not resided permanently on the Isthmus?

Mr. PAINE. No; I have visited the Isthmus twice, spending several weeks each time.

The CHAIRMAN. In what year did you visit the Isthmus?

Mr. PAINE. In the latter part of 1899, and the beginning of 1901.

The CHAIRMAN. What is included in your duties?

Mr. PAINE. My charge is the operating of both the steamer line and the railroad.

The CHAIRMAN. You have not had in charge, then, the repairs or the construction of the road itself?

Mr. PAINE. By general direction.

The CHAIRMAN. But personally you have not?

Mr. PAINE. Personally not.

The CHAIRMAN. Who is the man who has had the personal charge of that?

Mr. PAINE. Our general superintendent there is Colonel Shaler.

The CHAIRMAN. Where is he?

Mr. PAINE. He is stationed at Colon.

The CHAIRMAN. He resides there permanently?

Mr. PAINE. He lives there permanently; but all of our officials are expected to come north and have a vacation of from six weeks to two months when they can be spared.

The CHAIRMAN. For what cause?

Mr. PAINE. Well, for the recruitment of their physical condition, and so that we can have communication with them.

The CHAIRMAN. Is that recruitment of physical condition made necessary by the climate?

Mr. PAINE. We think so.

The CHAIRMAN. What about your operators? Do you give them furloughs in the same way?

Mr. PAINE. A great many of them. All our men from the north are entitled to two months' vacation every year.

The CHAIRMAN. Do they select the time or do you select it?

Mr. PAINE. We select it according to the necessities of the business.

The CHAIRMAN. During that vacation does their pay run on?

Mr. PAINE. They are paid full pay for one month and half pay for the other month.

The CHAIRMAN. How about their transportation back and forth?

Mr. PAINE. They have transportation for \$10 each way.

The CHAIRMAN. There was a period during the time of your administration, I suppose it was, when you renewed the cross-ties upon the

entire line of the road by importing *lignum vitæ* cross-ties from Carthagera?

Mr. PAINE. They were renewed just before I took charge of the road, to a large extent; yes.

The CHAIRMAN. They were imported from Carthagera, were they not—these *lignum vitæ* cross-ties?

Mr. PAINE. The greater part of them I think were procured on the Isthmus. We get enough there at present for all our renewals.

The CHAIRMAN. Of *lignum vitæ*?

Mr. PAINE. Of *lignum vitæ*; yes.

The CHAIRMAN. You prefer that wood because it is solid and not destructible by insects?

Mr. PAINE. It is less destructible.

The CHAIRMAN. By insects or climate, either?

Mr. PAINE. Yes. The creosoted ties do very well.

The CHAIRMAN. It is an expensive road to keep up, is it not, in the form in which you have it now?

Mr. PAINE. No, sir; because it is now in admirable physical condition for maintenance. It is completely ballasted with very excellent gravel or broken stone, and we have no frost there.

The CHAIRMAN. It is ballasted clear through the whole line, is it?

Mr. PAINE. Entirely; yes.

The CHAIRMAN. Where did you get the ballast?

Mr. PAINE. From the Chagres River; washed gravel from the Chagres River for the western end of the road, and beyond the summit broken stone.

The CHAIRMAN. Stone taken out of the excavations?

Mr. PAINE. Stones adjacent to the excavations.

The CHAIRMAN. You have quarries there, then?

Mr. PAINE. Yes.

The CHAIRMAN. Well you break the stone for ballast?

Mr. PAINE. Yes.

The CHAIRMAN. When were you last on the line of the railroad?

Mr. PAINE. In March, 1901.

The CHAIRMAN. What was the condition of that canal cut when you were there, commencing now at Colon and going westward. What was the condition as to silting up of the old canal cut?

Mr. PAINE. In 1901 I did not pass through the canal.

The CHAIRMAN. You passed along the railroad?

Mr. PAINE. I passed along the railroad; but to all external appearances the canal was just as it was when they left it. It was in perfect shape, but the silting below can only be determined by sounding.

The CHAIRMAN. Have you ever seen any evidence of silting by looking over the surface of the canal?

Mr. PAINE. You do not see that. I know that it has silted up in places by having passed through on a small steamer from Bohio to Colon.

The CHAIRMAN. To what extent, comparatively or approximately?

Mr. PAINE. That I could not guess, sir. I really could not say, only that we did touch in two or three places; but I made no soundings. I could see from that that there had been some silting.

The CHAIRMAN. As to the banks on the margins of the canal, were they in perfect condition?

Mr. PAINE. Very good, indeed, extraordinary, quite surprising. They are protected apparently by a very fine growth of shrubbery.

The CHAIRMAN. In enlarging the canal these banks will have to be removed and the shrubbery that is on them will also have to be removed?

Mr. PAINE. No; I think not. The shrubbery is not over 15 or 18 feet high.

The CHAIRMAN. When you enlarge the canal from the present prism to the prism as projected by the Isthmian Canal Commission, the engineer states that you will have to dig out that bank.

Mr. PAINE. I do not know, sir. I have not read their report and I do not know.

The CHAIRMAN. But the widening of the canal would extend beyond this bank, and you would have to dredge it out through this bank there which you say is protected with shrubbery.

Mr. PAINE. It is well protected by shrubbery.

The CHAIRMAN. To a large degree?

Mr. PAINE. Yes.

The CHAIRMAN. There are breaks in that bank, are there not?

Mr. PAINE. I did not observe any of any consequence.

The CHAIRMAN. How did the silt get into that canal channel if the banks would otherwise keep it out?

Mr. PAINE. Where it crosses the Chagres River.

The CHAIRMAN. It came down the river?

Mr. PAINE. Where the Chagres and its branches come in the silt has been brought down from the outside.

The CHAIRMAN. Was any of the ballast put on the roadway between Bohio and Colon obtained from these silt banks?

Mr. PAINE. No; it was obtained from the wide part of the Chagres River, at Matuchin, where the widening of the stream lessens the velocity of the current, and it has thrown down a considerable quantity and does throw down every year a considerable quantity of gravel, and we availed ourselves of that opportunity to collect it.

The CHAIRMAN. Where does that gravel come from?

Mr. PAINE. From above; I do not know where.

The CHAIRMAN. From up the river?

Mr. PAINE. Yes.

The CHAIRMAN. Have you at any time been there when there were floods in the Chagres River?

Mr. PAINE. Well, I have been there when the Chagres River was full, but not when it was above its banks.

The CHAIRMAN. What is the history of its navigation upon your works there, bridges, culverts, and the like?

Mr. PAINE. It has not troubled the railroad at all. The railroad crosses the Chagres on a fine iron bridge which was built when the road was first constructed. The spans are 100 feet, and there are five of them; but the bridge is not square across the river. It is somewhat diagonal, so that the bridge has to be longer than the width directly across the river.

The CHAIRMAN. How high is it above the level of the river at ordinary stages?

Mr. PAINE. I should say about 25 feet.

The CHAIRMAN. Has that bridge never been overflowed by the Chagres floods?

Mr. PAINE. I am told it has never been reached by a flood.

The CHAIRMAN. That is your opinion?

Mr. PAINE. That is my opinion.

The CHAIRMAN. Would you doubt that if you heard men here testifying who said that they had seen it moved and had to be replaced?

Mr. PAINE. It has not occurred since the present management was there, certainly. The bridge is evidently the one that was originally built there. It is an iron bridge.

The CHAIRMAN. When you first took charge there where did the railroad run? On which side of the ridge did the railroad run, opposite the Culebra cut?

Mr. PAINE. On the same side that it does now, the southern side.

The CHAIRMAN. That is to the left hand as you look out toward the Pacific?

Mr. PAINE. That is to the right hand.

The CHAIRMAN. To the right hand as you look out toward the Pacific?

Mr. PAINE. Yes.

The CHAIRMAN. Was that railroad moved from the former location and put in its new location before you went there?

Mr. PAINE. It has been done since I went there.

The CHAIRMAN. About what was the cost of that change?

Mr. PAINE. I do not know. It was done jointly by the canal company and by the railroad company, but all the work done by the railroad company was charged to the canal company, and they only know the cost of the work.

The CHAIRMAN. The work was done jointly by the two companies, but the charge was against the canal company?

Mr. PAINE. Yes.

The CHAIRMAN. What length of line was involved in that change?

Mr. PAINE. About 5 miles. It is shown on this little map.

The CHAIRMAN. Is that part of the route substantial and firm now?

Mr. PAINE. Perfectly. It is as fine a piece of road as exists anywhere.

The CHAIRMAN. Have you had any landslides across it?

Mr. PAINE. No, sir.

The CHAIRMAN. Has there ever been any across it?

Mr. PAINE. Not at all.

The CHAIRMAN. It was built since you went there?

Mr. PAINE. It was built since I went there. The contract for its construction was signed after I joined the railroad company's service.

The CHAIRMAN. What is the height of the Culebra ridge above the level of the railroad around that bend at that point that you took it around?

Mr. PAINE. I have a profile here showing that at the point where the railroad was cut through it was about 35 or 40 feet above the level of the railroad grade.

The CHAIRMAN. Is that the highest point on that line?

Mr. PAINE. That is the highest point on the railroad.

The CHAIRMAN. There must be a considerable gradient there then in ascending that ridge. What is the gradient in ascending that ridge?

Mr. PAINE. The gradient is about 60 feet to the mile, not quite 60 feet to the mile on the western side, and just about 60 feet to the mile on the eastern side. That is, it is just reversed to ordinary courses, because we run southeast there from Colon to Panama; but toward

the Pacific it is about 60 feet to the mile, and toward the Atlantic from the summit it is a little less than 60 feet to the mile.

Senator KITTREDGE. You give the maximum grade?

Mr. PAINE. Yes.

The CHAIRMAN. When you pass that bridge the railroad turns across the canal line again?

Mr. PAINE. Yes.

Senator KITTREDGE. In the direction of Panama, on the Pacific side?

Mr. PAINE. Yes.

Senator KITTREDGE. There you cross the canal line on a bridge?

Mr. PAINE. Yes.

Senator KITTREDGE. How high is that bridge above the level of the canal when it will be constructed?

Mr. PAINE. It is a temporary structure, and I should say the trestle is 30 feet or less than 30 feet above it at the deepest point.

The CHAIRMAN. It would have to have draws in it; otherwise the steamers could not get through at 30 feet elevation.

Mr. PAINE. Yes, if the location is kept in the same place.

The CHAIRMAN. And at that elevation of 30 feet?

Mr. PAINE. Yes.

The CHAIRMAN. After you cross the railroad, then you commence to descend toward Panama?

Mr. PAINE. Yes.

The CHAIRMAN. What is the gradient there?

Mr. PAINE. The grade continually diminishes, so that after 7 miles it becomes practically level; for the last $3\frac{1}{2}$ miles it is practically level.

The CHAIRMAN. Is that lower part swampy?

Mr. PAINE. The marshes are in two sections of about half a mile each. It is not really to be regarded as swampy. In the dry season there is no water there at all.

The CHAIRMAN. Do you cross on trestles or embankments?

Mr. PAINE. Embankments.

The CHAIRMAN. Both those marshes?

Mr. PAINE. Yes.

The CHAIRMAN. It is about 3 miles from there to the mouth of the river at La Boca?

Mr. PAINE. It is the mouth of the Rio Grande.

The CHAIRMAN. The mouth of the Rio Grande?

Mr. PAINE. Yes.

The CHAIRMAN. About 3 miles is the nearest approach you make to that by the railroad?

Mr. PAINE. By the main line, $2\frac{1}{2}$ miles.

The CHAIRMAN. And there you make a spur that runs off, which has recently been completed?

Mr. PAINE. It runs off from the main line to the wharf at La Boca.

The CHAIRMAN. Does that run through a flat country?

Mr. PAINE. That runs at the foot of the Ancon Mountain. It is partly across marshy land and partly on the edges of the mountain, so that it is all embankment all the way except one little spur of the mountain, which is cut through.

The CHAIRMAN. Well, when you get to the mouth of the Rio Grande there and you start out to sea, you have got some distance to go then to get to your pier, have you not?

Mr. PAINE. I do not understand.

The CHAIRMAN. From the coast line proper out to the pier you have got some distance to go?

Mr. PAINE. Oh, I should say 1,500 feet.

The CHAIRMAN. Only that?

Mr. PAINE. That is all.

The CHAIRMAN. Is that on a trestle or an embankment?

Mr. PAINE. That is on a stone embankment.

The CHAIRMAN. Riprap, I suppose, thrown up?

Mr. PAINE. Riprap on each side, yes.

The CHAIRMAN. How do you protect that against the tide?

Mr. PAINE. It is stone and it protects itself.

The CHAIRMAN. How far inland do the tides run there?

Mr. PAINE. Up the stream?

The CHAIRMAN. Yes; and up the canal cut?

Mr. PAINE. Oh, I do not know where that level would end. I suppose, however, that the tide would run up somewhere about to Pedro Miguel.

The CHAIRMAN. What is the height of this stone embankment that you put out there in order to reach your pier from the land?

Mr. PAINE. It begins at about 3 feet deep, and at the pier it is probably 10, at the shore end of the pier, and then the water begins to deepen rapidly.

The CHAIRMAN. Well, when the tide is in full, a 20-foot tide, how far is the platform of your pier or the foundation of your pier above tide water at the place where the ships load and discharge?

Mr. PAINE. The platform of our pier is about 8 feet, from 8 to 9 feet, above high water.

The CHAIRMAN. That would be 28 or 29 feet above sea level.

Mr. PAINE. Above low tide. We call sea level mean tide, generally.

The CHAIRMAN. On the Colon side, since you have been in charge of this railroad, have you had any trouble with your wharves and piers there?

Mr. PAINE. Nothing unusual of any kind.

The CHAIRMAN. Never have been washed away?

Mr. PAINE. No; no trouble with our wharves of any kind, except the ordinary repairs required by decay. Occasionally a ship strikes a little too hard, and requires something to be done to them, that is all.

The CHAIRMAN. When the northers blow in there and bring in heavy waves, do they give you any trouble at your wharves?

Mr. PAINE. They have never disturbed our wharves since I have been in charge. We had a pretty good norther there this year, but it did no damage to our wharves.

The CHAIRMAN. What wharves did it damage?

Mr. PAINE. It damaged the old wharf of the Pacific Mail Steamship Company.

The CHAIRMAN. How far is that from your wharf?

Mr. PAINE. Five hundred feet, I think.

The CHAIRMAN. Well, there have been seas in there that tore up the wharves out from yours, so we are informed.

Mr. PAINE. I have never heard of any, sir. I do not know; not in my time.

The CHAIRMAN. Do ships come to anchor after they enter the bay of Colon before they enter the canal?

Mr. PAINE. I do not know. There is a large basin at the mouth of the canal.

The CHAIRMAN. How far back from the coast line?

Mr. PAINE. It begins quite near to the coast line; I could not say; perhaps within 100 feet of the coast line.

The CHAIRMAN. Has that basin been dredged out?

Mr. PAINE. It formerly was.

The CHAIRMAN. Has it filled up any?

Mr. PAINE. I do not know.

The CHAIRMAN. You have not measured to see?

Mr. PAINE. I have never examined at all. I have seen that basin there and been in it in a small steamer, but I do not know what the condition of its soundings may be.

The CHAIRMAN. About what are the dimensions of that basin?

Mr. PAINE. I would have to give you a guess, sir, and my guess would not be worth much.

The CHAIRMAN. Give a guess. I want an approximate idea.

Mr. PAINE. Well, I should guess that it was perhaps 500 feet long, and I should say 400 feet wide, perhaps more. I am giving a guess without knowledge.

The CHAIRMAN. Now, the railroad structures there, I mean the houses used for operators and laborers, the dormitories as well as the machine shops, and all other appurtenances, are separate entirely from the canal property?

Mr. PAINE. Entirely; yes.

The CHAIRMAN. They have no connection with each other?

Mr. PAINE. None at all. The canal company has a hospital above our shops. That is the only building I know of that they have there.

The CHAIRMAN. Where is the great hospital which witnesses have talked about, which belongs to the canal company?

Mr. PAINE. Their great hospital is at Panama.

The CHAIRMAN. How far out of the city?

Mr. PAINE. I should say a mile and a half, perhaps. I can show you on the map.

The CHAIRMAN. Near the line of the canal?

Mr. PAINE. No, sir; it is on a mountain called Mount Ancon, right behind the city of Panama.

The CHAIRMAN. How far away from the line of the canal, about?

Mr. PAINE. Well, you might say a mile; less than a mile, probably.

The CHAIRMAN. It is a very large, expensive building, is it not?

Mr. PAINE. It is a magnificent affair. They say it cost \$2,000,000.

The CHAIRMAN. You would not build such a one as that for the railroad, would you?

Mr. PAINE. No. I do not think anybody needs it now.

The CHAIRMAN. A waste of money.

Mr. PAINE. Very fine structures, indeed.

The CHAIRMAN. Have you any statement of the health of your employees, the railroad employees, including the hirelings, the day laborers?

Mr. PAINE. We have no health reports with regard to any of our silver employees—that is, the men who are paid in silver, the natives and Jamaicans that we have there—except such as are in our hospital. We have a report every week showing the condition of the hospital, and generally we have from three to six or seven black men in the lower ward.

The CHAIRMAN. They are the silver men?

Mr. PAINE. They are the black men.

The CHAIRMAN. The silver men are on your silver roll?

Mr. PAINE. Yes.

The CHAIRMAN. They are the day-laborers?

Mr. PAINE. Yes; that is, a force of—well, last month we had—

Mr. DRAKE. One thousand three hundred and seventy-eight.

Mr. PAINE. Those are the days' work—1,378 men continuously for a month. That would mean one-half more men who are really employed. That is, they only work about half time, less than half time, I should say, that the Jamaicans average. We have a force of 300 men paid in gold, and very often there are none of them in the hospital, and sometimes there are as many as five at once. I do not remember any instance where there were more.

The CHAIRMAN. Would this 1,378 include those also?

Mr. PAINE. No; it does not include the white employees.

The CHAIRMAN. The 1,378, then, were the laboring people there?

Mr. PAINE. The men who worked on the docks and so forth.

The CHAIRMAN. Employed by the day?

Mr. PAINE. Yes.

The CHAIRMAN. You do not provide dormitories for them?

Mr. PAINE. No.

The CHAIRMAN. They go home; they live in Panama and Colon?

Mr. PAINE. Except 100 islanders from Fortune Island for whom we provide a dormitory.

The CHAIRMAN. What kind of people are they? Are they colored people?

Mr. PAINE. They are black; yes, they are all black. During the revolution it seemed important to have a force that would not be subject to be drafted by either side of the Colombian army, and so we got these Fortune Islanders, who are British subjects.

The CHAIRMAN. And there are 100 of them?

Mr. PAINE. One hundred of them.

The CHAIRMAN. You did that in order to have a permanent force that could not be taken by either side?

Mr. PAINE. That could not be disturbed; that would not be subject to conscription.

The CHAIRMAN. As to these other men who are natives there—citizens or inhabitants of that country—were they drafted out of your service, so as to disturb your operations?

Mr. PAINE. According to the decree they were permitted to remain in our service if they paid a certain sum—I do not remember exactly how much, \$10 or \$15—to the Government.

The CHAIRMAN. On the payment of that sum they were exempt from draft?

Mr. PAINE. Yes; but, you know, the men who carry out the conscription are not particular always as to whether the men have paid their tax or not, so that they were always somewhat in alarm lest they might be called to serve.

The CHAIRMAN. The conscription means a levy of troops by an order of the Government?

Mr. PAINE. Yes.

The CHAIRMAN. How about the revolutionists, those people who rise in insurrection against the Government? Would they come and take your laborers, too?

Mr. PAINE. Not unless they got on the road somewhere.

The CHAIRMAN. But then they would disturb the laborers?

Mr. PAINE. They were said to.

The CHAIRMAN. I suppose they would enlist them without their consent?

Mr. PAINE. It is enough to say that the blacks were very much afraid that they might be conscripted by either side.

The CHAIRMAN. They can get exemption from the Government by paying \$15 apiece.

Mr. PAINE. Something like that.

The CHAIRMAN. Were not those difficulties rather troublesome to the railroad constructors, operators, and repairers?

Mr. PAINE. No; we had no difficulty whatever.

The CHAIRMAN. No difficulty in getting labor?

Mr. PAINE. They were known all the way along to be our men.

The CHAIRMAN. And they were not disturbed?

Mr. PAINE. They were not disturbed.

The CHAIRMAN. The Government of the United States has had to send forces down there several times. What has it all been about?

Mr. PAINE. Yes, twice, since I have been connected with the road.

The CHAIRMAN. What was going on that made it necessary for us to send a force down there?

Mr. PAINE. The two parties were rather indifferent as to whether they fired at each other across the railroad or in any other direction, and if they fired across the railroad it was uncomfortable for the trains. That only happened occasionally, but the United States forces prohibited their fighting along the line of the road, and we had no further trouble. We had two trains interrupted each time, I believe, prevented from going across, once in 1900 and once in 1901.

The CHAIRMAN. Now, these rows and quarrels there are among the people of Panama, are they not?

Mr. PAINE. As far as I know, sir, they are people of all the adjoining district.

The CHAIRMAN. People who inhabit that country?

Mr. PAINE. Well, we really have not the means of knowing exactly where they do come from.

The CHAIRMAN. I do not mean that. I mean in a general sense whether the quarrels and disturbances are among the people of that country or between them and the people of some other foreign country?

Mr. PAINE. Oh, yes; they are isthmian people.

The CHAIRMAN. It is not an invasion from some foreign state or country that causes these disturbances?

Mr. PAINE. Not so far as we know.

The CHAIRMAN. It is the insurrectionary spirit among the people themselves, under different leaders?

Mr. PAINE. That is what we understand.

The CHAIRMAN. Following what the Spanish call "pronunciados" or "pronunciamientos."

Mr. PAINE. I think it is probably a little different from that, sir; but after all they profess to be animated by political principles.

The CHAIRMAN. That is what I was coming to. It is a political quarrel. These quarrels have all been of that character, political quarrels.

Mr. PAINE. I suppose so.

The CHAIRMAN. It was not the oppressions of individual men, but it is the adherents of the different leaders who engage in these quarrels.

Mr. PAINE. Yes.

Mr. DRAKE. The issue is really clerical and anticlerical. The present government is clerical. The Liberal party is opposed to it. That is the real issue. Colombia stands alone right in the center of a group of republics that are all liberal except Colombia. It is the only Roman Catholic country there, and all the others are liberal; so the fight in Colombia is between the clerical party now in control of the government and the anticlerical party, who call themselves the "Liberals."

The CHAIRMAN. It is the old characteristic of South American quarrels.

Mr. PAINE. Yes.

The CHAIRMAN. As it was in Mexico?

Mr. PAINE. Yes.

Mr. DRAKE. In Costa Rica, Chile, Peru, Ecuador, the Liberals have succeeded. Colombia stands almost alone now in being under the control of the clerical party.

The CHAIRMAN. And hence she has the ill will of her neighbors?

Mr. DRAKE. Yes; or the good will. They want her to be liberal too.

The CHAIRMAN. That is all I want to ask.

Senator KITTREDGE. When did you first become identified with the Panama Railway Company properties?

Mr. PAINE. I became connected with the Panama Railway Company in May, 1899.

Senator KITTREDGE. When did you first visit the properties?

Mr. PAINE. In November, 1899.

Senator KITTREDGE. Since that time you have been there twice?

Mr. PAINE. That time and another time.

Senator KITTREDGE. State in a general way the terminal facilities of Colon.

Mr. PAINE. At Colon we had five wharves which are shown on a map I have here. These four upper wharves are in existence. One belongs to the Royal Mail S. P. Company. This fifth wharf was a temporary wharf, and was removed.

This wharf over here [referring to the map] is the Pacific Mail wharf. These are all covered with buildings with iron frames and iron roofs, and accommodated by railway tracks. This map does not show any track on this, but we have recently put three tracks upon it.

We have a complete set of shops surrounding this turntable, a paint shop, an engine house, a car shop, a blacksmith shop, a machine shop, the usual equipment of a good railroad. They are ample for the care of our cars and engines. They all have iron roofs, and most of them have galvanized iron sides.

Senator KITTREDGE. At this time you have spoken of, you carefully inspected all the property of the railway company?

Mr. PAINE. I spent three weeks there, and I saw every item of property belonging to the company that I know of.

Senator KITTREDGE. What is the present condition of the terminal facilities, the roundhouse, the wharf, and all other property at Colon and along the line?

Mr. PAINE. I can say generally that they are in first-rate repair, just as good repair as we can have them.

Senator KITTREDGE. The road, I suppose, is standard gauge?

Mr. PAINE. A 5-foot gauge.

Senator KITTREDGE. And what weight of rail?

Mr. PAINE. The original rail, I think, was 56 pounds to the yard. The renewals have been with rails of 62 pounds to the yard, and now the standard is 70.

Senator KITTREDGE. How recently has there been a general renewal of rails?

Mr. PAINE. There has been no general renewal, I think. There has been a piecemeal renewal, and I should say that one-half, probably, of the whole length of the line was of the original rail (or of the early period of steel rails, we have no history of these rails), perhaps not so much as that; but I should guess that.

Senator KITTREDGE. What is the life of a rail in Panama?

Mr. PAINE. Why, it should be a hundred years—the traffic is so small, you know. The tonnage carried over a rail limits its life.

Senator KITTREDGE. Is that altogether true? Do not the atmospheric and climatic conditions affect it?

Mr. PAINE. Corrosion does not enter into the question, at least it does not there. Where rails are operated upon, except in tunnels, corrosion does not really count.

Senator KITTREDGE. So that the only elements in the destruction of the life of a rail at Panama is wear and tear?

Mr. PAINE. The wear and tear on it, yes.

Senator KITTREDGE. What is true about the ties on the railroad?

Mr. PAINE. The ties have lately been renewed, so that they do not require a renewal of more than, perhaps, 500 or 600 in a year.

Mr. DRAKE. They are chiefly of *lignum vitæ*.

Senator KITTREDGE. What is the life of the ties in that country?

Mr. PAINE. I have not had experience enough to tell you.

Senator KITTREDGE. Before you became connected with the Panama Railroad Company, what was your business?

Mr. PAINE. I have been an engineer all my life, and a railroad manager.

Senator KITTREDGE. With what railroads were you connected formerly?

Mr. PAINE. I began upon the Vermont Central Railroad in 1845. I was upon the Champlain and St. Lawrence until 1854. I was building two or three railroads in Wisconsin until 1858.

I then became connected with the Michigan Southern and Northern Indiana, and was division superintendent and then chief engineer of that road until 1872, when I became general superintendent of the Lake Shore and Michigan Southern Consolidation. I remained there until 1881, when I became general manager of the West Shore Railroad during its construction. I have since been a vice-president of the Erie Railroad, and now I am here.

Senator KITTREDGE. I simply wished to get that into the record, so that others would know it.

The CHAIRMAN. That is a very high record.

Senator KITTREDGE. A very good record.

Mr. DRAKE. And he was president of the American Society of Civil Engineers, if you will allow me to interpolate that.

Mr. PAINE. That is where I got my commission.

Senator KITTREDGE. So that you know a good railroad when you see it?

Mr. PAINE. I profess to; yes, sir.

Senator KITTREDGE. State generally what your judgment is as to this railroad property.

Mr. PAINE. I think it is a first-rate railroad property; quite complete in all respects.

I was going to add that we have an ample equipment, I think 35 locomotives, 60 passenger cars, and 960 freight cars.

The CHAIRMAN. And you have a good income?

Mr. PAINE. Yes.

Senator KITTREDGE. What is the physical condition of the equipment you have just mentioned?

Mr. PAINE. As good as an equipment of that age and period of construction can be, except a few locomotives not in good order. It is light equipment, provided for a light railroad at the time it was built.

Senator KITTREDGE. What is the character of the station houses along the line?

Mr. PAINE. They are all in good order, but there are not such station houses as we would have in the North. Each station consists of an elevated platform, roofed over, with an open, slatted construction around the outside, and an apartment finished in one end for the office. The station at Colon, however, is a city station, you might say, and at Panama a very fine structure with two stories, with apartments overhead for the conductors, etc.

Mr. DRAKE. And there is a freight house at Colon.

Senator KITTREDGE. What, in your judgment, is this railroad property worth?

Mr. PAINE. I have never given a thought to that.

Senator KITTREDGE. The capital is, according to Mr. Drake, something over \$12,000,000, according to the books in 1900, and since that time the pier on the Panama Bay has been added. Now, what do you say the value of all that property is; including the steamships, the wharves, the terminal facilities, the shops, the roadbed, the equipment, and the landed properties of the company?

Mr. PAINE. I suppose that the property is worth any sum upon which it will earn a fair interest. That is the way I would appraise the property.

The CHAIRMAN. What would you call a fair interest?

Mr. PAINE. Four per cent, after it paid all expenses. This has been able, since I have known it, to earn fully that sum.

Senator KITTREDGE. Then, based upon that, what is the fair value of that property?

Mr. PAINE. I would say the fair value of the property was at least what it is reckoned at in the estimate.

Senator KITTREDGE. Now, does that valuation include these landed interests?

Mr. PAINE. I believe not at all.

Senator KITTREDGE. Does that include the hospital you have mentioned?

Mr. PAINE. It includes our hospital, of course, and these buildings. I suppose it does.

Senator KITTREDGE. You mean, then, the hospital and the buildings that are absolutely necessary to the proper conduct of your railroad properties?

Mr. PAINE. Yes.

Senator KITTREDGE. But it does not include your landed interests outside of that. Is that right?

Mr. PAINE. Not at all. For instance, there are 700 acres in this island.

Senator KITTREDGE. I am speaking of the railroad property and land grants.

Mr. PAINE. The land grants, as I understand, are not included in the valuation.

Senator KITTREDGE. But they are included in the capitalization?

Mr. DRAKE. No, sir; never have been reduced to anything.

Mr. PAINE. Not all, as I understand.

The CHAIRMAN. You are speaking of the outside unappropriated or unsurveyed lands; but those on which houses are built are included?

Mr. DRAKE. They are capitalized.

Senator KITTREDGE. I want it so we may have it clearly in the record just what is included in the capitalization of the company.

Mr. PAINE. I think Mr. Drake gave you a very clear answer to that, and he is much more familiar with that matter than I am.

Senator KITTREDGE. Then I will withdraw that question.

Mr. DRAKE. I tried to make it clear that the land grants that were outside have never been taken into account, or they have never been located, but they might be at any time, and under our concessions might be of great value if the canal was constructed.

The CHAIRMAN. But the lands that have been located and improved are all included in the capitalization.

Mr. DRAKE. Yes.

The CHAIRMAN. That makes it simple enough.

Senator KITTREDGE. Now, in regard to the general sanitary conditions of that country.

The CHAIRMAN. Before you leave that, please, can you account for the fact that a railroad that is so well built, so permanent, that has such a large amount of traffic, that earns 4 per cent upon its capitalization of \$13,000,000—that the stock of that railroad company should be selling at 60 to 80 cents on the dollar? Can you account for it in any way?

Mr. PAINE. I have no knowledge of those things except through experience. When I was on the Michigan Southern and Northern Indiana Railroad its shares sold for \$5. Within two years they sold for \$75, and now they are worth \$135 or \$140.

The CHAIRMAN. You do not know of any reason that you can state why the stock of this railroad company should be depressed below its par value?

Mr. PAINE. I do not even know that it is, sir.

The CHAIRMAN. I assume that it is. It has been testified to.

Mr. PAINE. I do not know any reason why it should be.

Mr. DRAKE. May I answer as a stock broker?

The CHAIRMAN. Yes.

Mr. DRAKE. There are only 1,000 shares which are held by these minority stockholders, and that amount constitutes no market. The stock is stricken off the list of the stock exchange for the same reason

that the stock exchange has stricken off any other stock, because the bulk of the stock is held in one lot and there is no active market for it, and if it were largely sold it could not be delivered. So that trade in the stock is necessarily small.

The CHAIRMAN. Does the stock market control the real selling price of railroad shares?

Mr. DRAKE. Yes. By its regulations it makes the stock deliverable or not.

The CHAIRMAN. It is a terrible tyrant if it strikes down the property of such a railroad as this from 100 to 60, a difference of 40 per cent, which is lost by the gambling of the stock market, as I understand it.

Senator KITTREDGE. What about the general sanitary condition all along the Panama Railway?

Mr. PAINE. There has never been any epidemic since I have been connected with the company; no epidemic of any kind. They have had yellow fever in Panama among the troops, but I do not know of a single instance of yellow fever among our men, among our employees or among those of the canal company, except one, and that was a doubtful case. He was our agent at La Boca and Panama—Captain Beers. He had had yellow fever before, and he said that he did not have it at this time, but his physician pronounced it yellow fever, seemingly because it was convenient. That is the only case I have ever known among our employees.

The CHAIRMAN. But the troops, you say, had it?

Mr. PAINE. The troops had it, yes. It did not extend among the citizens of Panama at all—not in a single instance.

The CHAIRMAN. These troops were native people, were they not?

Mr. PAINE. These troops came up from Baranquilla and Buenaventura.

Senator KITTREDGE. What about the harbor at Colon?

Mr. PAINE. In what respect, sir?

Senator KITTREDGE. Whether it is a good harbor and affords protection to the shipping?

Mr. PAINE. It is a first-rate harbor at all times, except when the northers are blowing.

Senator KITTREDGE. What do you know about the northers?

Mr. PAINE. When the northers blow the ships have to leave the pier and go to sea, or go around the coast to get in a protected harbor. That has only been once since I have been connected with the company. That was this spring. But in the winter season, which is the season of the northers, during our winter season we anticipate that there will be very likely a norther strike the shipping in Colon.

There has been only one disaster. That was a coal ship that was serving us and did not have her fires up to get away. As she left the dock she fouled her propeller with one of the ropes that held her to the dock, and she drifted onto the shore. That is the only instance of any accident to any shipping that I have known of.

Senator KITTREDGE. Do you know anything about the proposed improvement of that harbor recommended by the Walker Commission?

Mr. PAINE. No, sir; not at all.

Senator KITTREDGE. Have you any acquaintance with the coast up by Greytown?

Mr. PAINE. I have not at all.

Senator KITTREDGE. What are your duties as general manager? Do you have anything to do with the traffic arrangements?

Mr. PAINE. I am theoretically in charge of the traffic. Practically we have a traffic manager who attends to the duty of making the traffic arrangements.

Senator KITTREDGE. But you are his superior officer?

Mr. PAINE. Yes; I am his superior.

Senator KITTREDGE. Without going into details with regard to the traffic arrangement that you have, you have heard the testimony of Mr. Drake, have you?

Mr. PAINE. Yes; I heard it all.

Senator KITTREDGE. And have you anything to say in connection with that testimony? Is it substantially correct?

Mr. PAINE. So far as I know it is entirely correct and true.

Senator KITTREDGE. Has your company any arrangement, directly or indirectly, with any transcontinental line?

Mr. PAINE. None whatever.

Senator KITTREDGE. Have you any knowledge of any arrangement between your company and the officers of any transcontinental line affecting traffic?

Mr. PAINE. None whatever, and there has not been since I have known anything about it.

The subcommittee (at 2 o'clock p. m.) took a recess until February 27, 1902, at 10.30 a. m.

BY-LAWS

OF THE

UNIVERSAL INTEROCEANIC PANAMA CANAL COMPANY,

CREATED BY

MR. FERDINAND DE LESSEPS,

ACCORDING TO

AN ACT ENTERED INTO BEFORE MESSRS. CHAMPETIER DE RIBES AND
DELAQUERANTONNIAS, NOTARIES IN PARIS, ON THE
20TH OF OCTOBER, 1880.

BY-LAWS OF THE UNIVERSAL INTEROCEANIC PANAMA CANAL COMPANY CREATED BY MR. FERDINAND DE LESSEPS, ACCORDING TO AN ACT ENTERED INTO BEFORE MESSRS. CHAMPETIER DE RIBES AND DELAQUERANTONNAIS, NOTARIES IN PARIS, ON THE 20TH OF OCTOBER, 1880.

TITLE FIRST.—*Creation and object of the company, denomination, residence, and duration.*

ARTICLE 1. There is created, between Mr. Ferdinand de Lesseps, the conferees, and the subscribers to shares hereafter created, a company under the denomination of the “Universal Interoceanic Panama Canal Co.”

ARTICLE 2. This company has for object:

First. The construction of a maritime canal for large navigation between the Atlantic and Pacific oceans, through the part of the American isthmus belonging to the United States of Colombia.

Second. The exploitation of the said canal and sundry enterprises belonging thereto.

Third. The construction or exploitation of all lines of railroad which the company should deem for the good of the undertaking to be constructed or bought in the vicinity of the canal.

Fourth. The exploitation of lands conceded and mines contained therein.

The whole according to the clauses and conditions of the concession, such as result from the law of the Congress of the United States of Colombia dated May 18th, 1878. (Law 28 of 1878.)

ARTICLE 3. The office of the said company is in Paris, temporarily No. 7 Rue Saint Florentin, at the domicile of Mr. Ferdinand de Lesseps, and hereafter in such locality as the board of directors may select.

ARTICLE 4. The company commences to date from the day of its final creation. Its duration shall be equal to that of the concession; that is to say, ninety-nine (99) years, to be reckoned from the day when the canal will be opened in whole or in part to the public service, or when the grantee company will commence to receive tolls for transit and navigation.

TITLE SECOND.—*Contribution, social capital, share, and payments.*

ARTICLE 5. In virtue of the conditions agreed upon between him and the International Civil Company of the Interoceanic Canal, grantee of said canal, Mr. Ferdinand de Lesseps brings to the company, with a guarantee of right in the matter:

First. The concession to this civil company by the Government of the United States of Colombia of the exclusive privilege for the excava-

tion through its territory and for the exploitation of a maritime canal between the Atlantic and Pacific oceans, with all its advantages, as also with all its charges stipulated by the law of Congress of the United States of Colombia dated 18th of May, 1878. (Law 28 of 1878.)

Second. All surveys, work, and documents appertaining to the said grantee company relative to the line and the project submitted to the International Congress of Study of the Interoceanic Canal.

Third. The benefit of all the agreements which the said grantee company has obtained from the board of directors of the Panama Railroad Company.

The company will be the owner of this contribution from the date of its final creation. It will be substituted, starting from this date, to all the rights and obligations resulting from the law of concession of United States of Colombia.

ARTICLE 6. In view of this contribution, in order to conform to the obligation which Mr. Ferdinand de Lesseps has had to assume to assure to the company hereby created the said contribution, there is allotted to the civil company the beneficiary of the law of concession of May 18th, 1878.

First. One million (1,000,000) of francs, cash, to be paid within fifteen (15) days from date of the final creation of the said company.

Second. Four millions (4,000,000) of francs, cash, payable without interest in the month which will follow the date fixed by the board of directors of the present company for the payment of the sum which will complete the liberation of one-half of the shares subscribed, which will be hereafter mentioned.

Third. And five millions (5,000,000) of francs, the value of ten thousand (10,000) shares, five hundred (500) francs each, of the said company, entirely liberated.

These ten thousand (10,000) shares entirely liberated will be the property of the grantee civil company, starting from the final creation of the present company, but they shall not be delivered and shall be of no profit to them, except under the reservations following.

Up to their delivery, which will be regulated and determined, they will be registered in the names of those having rights to the civil company, and will remain attached to the stub with the effect of a pledge for the exclusive guarantee of the authenticity of the law of concession and of the claims that a third party might bring against the civil company for services rendered. The civil company may exact the remittance of said shares to the rightful claimant, either when the subscribed shares will be liberated entirely or when the company hereby created shall have called either upon its shares or by means of a loan for the payment of a total capital of five hundred millions (500,000,000) of francs.

These ten thousand (10,000) shares, though they may be entirely liberated, or if they remain attached to the stub, or that they may be detached in the above unforeseen case before the entire liberation of the shares subscribed, will not have any right to interest or dividend, except on the same conditions of other subscribed shares, so that during the period of the construction of the canal they will have no right to an interest of 5 per cent only upon the amount of capital called for on the subscribed shares and as fast as installments are called.

While these ten thousand (10,000) shares remain attached to the stub the interest or dividends which may be due will be paid to the holders

upon special certificates which will be delivered to them in conformity to the model which may be determined by the board of directors of the company hereby created.

The delivery of the securities and money by the company will take place for the benefit of the civil company in the terms agreed between Mr. Ferdinand de Lesseps and the said civil company.

ARTICLE 7. On the other hand to organize the present company and to prepare its creation in 1879, as well as in 1880, Mr. Ferdinand de Lesseps has had to make an appeal for capital and the help of persons devoted to the creation of this enterprise.

The accounts of expenses made or pledged for, previously to the final creation of the company, will be presented at the first general meeting of shareholders and submitted for the approbation of the second meeting, and after approbation the amounts of these expenses will become a company debt.

Besides, the present by-laws will stipulate hereafter, under article 60, with such reserve as therein expressed for the benefit of sundry persons whose capital and help have served to the creation of the present company, 15% upon the net profits of the enterprise.

The apportionment of this 15% shall be made under the care of Mr. Ferdinand de Lesseps in the terms agreed between him and his auxiliaries.

ARTICLE 8. The company's capital, made up of contributions in nature and in cash capital, is fixed to three milliards of francs, and divided in six hundred thousand shares of 500 francs each.

Ten thousand shares being allotted to the grantees for representation of their contribution, there shall be issued five hundred and ninety thousand shares cash.

ARTICLE 9. The amount of each share is payable in cash at the rate of exchange in Paris, in the company's office or to the representatives of the company which will be designated for subscription by the appearing founder and in the future by the board of directors.

Twenty-five francs shall be paid immediately upon each share at the time of subscription and one hundred francs more shall be paid after its close.

The three hundred and seventy-five francs in addition shall remain in reserve, and will only be called subsequently to the time and in the proportion which will be fixed by the board of directors.

No payments shall be made previous to a call for funds.

They will be made in conformity to calls of the board by means of advertisement, three months in advance in one of the Paris newspapers authorized to receive legal advertisements, and in foreign newspapers which may be selected by the board of directors.

ARTICLE 10. The first payment will be acknowledged by a nominative receipt which during the six months commencing from the creation of the company will be exchanged against a certificate also nominative.

All following payments to be made except the last will be mentioned upon this temporary certificate.

The last payment shall be made against the delivery of a final share, nominative or to bearer, at the option of the holder.

However, shares half paid may be converted into shares to bearer by resolution of a general meeting.

ARTICLE 11. The board of directors will determine the form and style of the share certificates.

Temporary certificates will be detached from the stub of a register; they will be in numerical order and will be stamped with the dry seal of the company; they will be signed by two directors or by a director and a delegate from the board of directors.

ARTICLE 12. All subscriptions on which the second payment completing the first quarter shall not have been made at the time set upon for its call shall be considered null and void without legal notice and with full right.

The first payment becomes the property of the company as damages.

ARTICLE 13. In default of payment of the other installments at the times determined, interest will be due for each day of delay at the rate 5 per 100 per year.

The company besides will have the right to have such shares sold upon which payments are in arrear.

To this effect the numbers of such shares will be published as in default in one of the newspapers of Paris designated to receive legal notices.

Two months after such publication the company, without any demand in due form of law and without any subsequent formality, shall have the right to proceed with the sale of the said shares for the account of and at the risk and peril of the defaulter.

Such sale will be made upon duplicates one or several times at the Paris Bourse or at London through the agency of a stock broker.

The previous certificates of shares thus sold shall become null by full right by the fact of the sale; there shall be delivered to the purchasers new certificates which will bear the same numbers and will be the only ones valid.

In consequence all shares not bearing the regular mention of installments to be paid cease to be negotiable.

The stipulations prescribed in the present and the preceding article do not prevent the simultaneous use by the company of ordinary means of right, if deemed useful, against the delinquent shareholders.

ARTICLE 14. The money received from the sales made in virtue of the preceding article, deducting expenses and interest, is imputed in the terms of right upon what is due by the expropriated stockholder or by his transferees who remain responsible for the difference, if there is any deficit, and who are benefited by the excess if excess there be.

ARTICLE 15. The board of directors may authorize the deposit and the preservation of the shares to bearer in the company's hands. In such a case it will determine the form of nominative certificates of deposit, the conditions of their delivery, and the guarantees with which the execution of such measure should be surrounded in the interest of the company and the shareholders.

ARTICLE 16. The transfer of shares to bearer is made by a simple exchange of the certificates.

For receipts and nominative shares the exchange will be made by a declaration of transfer signed by the transferrer and the transferee, or their substitutes, upon registers to be kept in the office of the company or of those of its representatives designated for that purpose by the board of directors wherever needed.

The company may require that the signature of the parties should be duly certified.

ARTICLE 17. Each share carries a right to a proportional part in the property of the company's assets.

ARTICLE 18. Every share is indivisible; the company will recognize but one owner for each share.

ARTICLE 19. The rights and obligations attached to a share follow the certificate held in any hand.

The possession of a share carries with it full right of adhesion to the by-laws of the company and to the resolutions of the general meeting of the stockholders.

ARTICLE 20. The heirs or creditors of a stockholder under any pretext whatever can not cause the affixing of seals upon the real estate, the values, or revenue of the company, nor ask for their division or their public sale, nor to interfere in any manner in its management. They shall for the exercise of their rights rely upon the company's inventories and the annual account approved by the general meeting of the stockholders.

ARTICLE 21. The stockholders shall be responsible only to the amount of the capital of their shares beyond which any call for funds is prohibited.

TITLE THIRD.—*Board of directors.*

ARTICLE 22. The company will be managed by a board of eighteen members at least and twenty-four members at most, taken from among the shareholders.

A committee selected from its midst will be specially charged with the management of the business of the company.

ARTICLE 23. Owing to their functions the directors shall not contract any personal or joint obligations; they are only liable for the execution of their duties.

ARTICLE 24. The directors shall be appointed by the general meeting of stockholders.

However, the first board of directors shall be composed of twenty-four persons, of whom the names are following and who shall accept such functions of director before the final completion of the company, viz:

Ferdinand de Lesseps, presiding manager of the Suez Canal Company; Allavene, Charles Francois Hubert, retired general; De Cicourt, Anne Marie Joseph Albert; Charles Cousin, principal inspector representative of the Northern Railways; Daubree, Jean Basptiste Emmanuel, director in the Suez Canal Company; Marius Fontana, general secretary of Suez Canal Company; Delagarde, Harel, Jules Herbette, Max Hellman, of the firm of Seligman Freres et Cie.; Baron Jules de Lesseps, director of the Suez Canal Company; Charles Aime de Lesseps, director of the Suez Canal Company; Victor de Lesseps, director of the Suez Canal Company; De Mondesir, Paul Antoine Theodore, director of the Suez Canal Company; Monet-Bey, Theodore Antoine, director of the Suez Canal Company; Mourette, Edme Constant Charles Vincent, director of the Suez Canal Company; Theodore Motet, Adolph Peghous, director of the Suez Canal Company; Baron Poisson, director of the Company of Deposits and Accounts Current; Ernest Prevost, Piat, William Seligman, of the firm of Seligman Freres et Cie.; General Etienne Turr, Dauprat, Louis Jules Eugene, director of the Suez Canal Company.

This first board is appointed for three years; the appointment will not be submitted to the general meeting for organizing the company. At the end of the three first years it will be in whole submitted to a reelection.

ARTICLE 25. Commencing from this time the directors shall be appointed by the general meeting of the shareholders for six years at the utmost.

Consequently so long as the board will be composed of eighteen or twenty-four members it shall be renewed every year by one-sixth until the entire renewal of the board has decided the order of rotation. The outgoing members will be selected annually by drawing lots.

The outgoing directors may be reelected.

If the number of directors selected by the general meeting should become less than twenty-four and above eighteen, the general meeting which would thus decide the number of directors shall have to determine the manner of their renewal and the duration of their functions.

ARTICLE 26. In case of vacancy arising from resignation or death temporary provision shall be made for the vacancy to be filled by the board of directors up to the time of the next general meeting of the stockholders.

The directors thus selected shall only remain in power during the time remaining of the period of their predecessors.

The first board appointed as above under article 24 during the time of its function shall have the faculty to complete or to renew itself, if need be, up to the number of twenty-four members, subject to confirmation by the next general meeting.

It is well understood that the latter members shall only remain in power up to the expiration of the third financial year.

ARTICLE 27. Each director must be the owner of one hundred shares, nominatives, unalienable, stamped with a seal showing their unalienability, and they shall remain in the hands of the company during the whole time of his functions.

These shares are pledged as a guarantee for all acts during the management, even of such as would be exclusively personal to one of the directors.

ARTICLE 28. A share of three per cent in the net annual profits shall be allowed to the directors on account to their trouble and care under the reservations mentioned in article 60 hereafter.

During the time of the work and, if need be, during the first years following the opening of the maritime canal to large navigation, there shall be allowed to the directors in place of the 3 per cent stipulated hereabove, an annual allowance which shall be included in the expenses of management, the amount of which shall be fixed by the second general meeting of the stockholders who organized the company.

The board of directors shall decide the special allowance which is to be made to the members of the committee out of this sum or from the three per cent of profits.

ARTICLE 29. The board of directors will elect each year from among its members one president and three vice-presidents.

The president and the vice-presidents can always be reelected.

In case of absence of the president and the vice-presidents, the board will designate at each meeting which of its members shall fill the position.

ARTICLE 30. The board of directors will meet at least once a month. It shall also meet upon the call of the president as often as the interest of the company may require.

The decisions shall be adopted by a majority of the members present.

In case of a tie the vote of the president will be the casting vote.

At least seven directors shall be present to validate the resolutions of the board.

When seven directors only are present, the resolutions to be valid shall be carried by a majority of five votes.

None can vote in the board by proxy.

ARTICLE 31. The general secretary of the company shall be present at the meeting of the board of directors, with the privilege of consultation.

ARTICLE 32. The decisions of the board of directors shall be recorded in minutes signed by the president and a member present at the meeting.

The copies or extracts of the minutes to be valid at law or elsewhere should be certified by two directors.

ARTICLE 33. The board of directors shall have the utmost powers to insure the construction of the canal, for the management of the company, and for the choice and exploitation of the domainal lands ceded by paragraphs 7 and 8 of article 1, and by article 4 of the law of concession.

They may ask for all new concessions, make agreements with third parties for the purchase of concerns or of concessions having relation to any of the purposes of the company.

They will fix the rules of order of the general meetings; they shall examine the accounts submitted to the general meeting; they shall make a report to the general meeting upon the accounts and the state of the business of the company.

They shall fix the dividends temporarily, and determine, if need be, the advances to be paid on January 1st upon the dividend of the period closed by the inventory of June 30th preceding.

They shall decide upon the propositions of the committee concerning the following, viz: .

First. Call for cash from stockholders.

Second. Temporary investment of funds on hand.

Third. Surveys and schemes, plans and estimates for carrying out the work.

Fourth. Contracts by the job.

Fifth. Purchases, sales, and exchanges of personal property and real estate, purchase of ships or machinery necessary for the execution of the work and the management of the enterprise.

Sixth. Annual budgets.

Seventh. Fixing and modifying rights of all nature to be received in virtue of the concession, the conditions, and mode of collecting tolls.

Eighth. Disposal of the reserve funds.

Ninth. Disposal of the funds for pensions, help, and encouragement of the employes.

Tenth. Regulations for deposits of the shares and bonds of the company.

And generally shall do for the best interest of the company all that they may deem useful or necessary.

ARTICLE 34. The board shall appoint from its members those who are to be a part of the committee.

They may delegate to one or several directors, to officers, employes of the company, or to others, part or all of their power by special authority for one or more transactions or determined purposes.

TITLE FOURTH—*Committee.*

ARTICLE 35. The committee shall be composed of the president of the board of directors and six members at the most of the board of directors.

The powers of members of the committee will last for the same period as those they possess as members of the board of directors.

ARTICLE 36. The committee will meet as often as necessary for the good management of the business and at least once a week.

In order to make its work valid there shall be at least three members present.

All resolutions shall be adopted by a majority of the members present.

In case of a tie, the vote of the president of the board, if present, shall be the casting vote.

ARTICLE 37. Minutes of the meeting of the committee shall be kept. These minutes shall be signed by two members present at the meeting.

The extracts from such minutes to be valid in courts or elsewhere shall be certified to by two members of the committee.

ARTICLE 38. The committee shall have full power for the management of the business of the company.

They shall provide for the execution of the obligations imposed by the law of concession and the by-laws, as also for the resolutions adopted by the general meeting and the decisions of the board of directors.

They shall submit to the board of directors propositions relating to the purposes defined in article 33.

They shall represent the company and shall act in its name by one or more of its members in all cases where a special decision does not require the intervention of the general meeting of the stockholders or of the board of directors. They especially shall dismiss employes, determine their functions and attributes, fix their compensation and gratuities.

They shall regulate the work of the offices, prescribe the regulations and order of business, and will order and regulate expenses. They shall sign all correspondence, all notes, endorsements, contracts, drafts, transfer of "rentes," public securities, and values belonging to the company.

They shall decide upon all bargains, agreements, except contracts by the job for the whole of the work; they will authorize awards; make all purchases of furniture; authorize all rentals and leases.

They will attend to the collection of tolls, the recovery of all moneys due, will sign all receipts and discharges; they will decide all withdrawals of mortgages, seizure, injunctions, and other hindrances, with all abandonments of privilege, of mortgages or action for cancellation, the whole before or after payment.

They may agree, compound, compromise, plead as prosecutor or defendant, but judiciary proceedings are to be directed by or against the president of the board of directors.

In consequence the legal notices shall be served and received by the president of the board at the company's office.

The decisions of the committee, the acts and agreements approved by them, shall be signed by the president or by one of the members of the committee designated for that purpose.

ARTICLE 39. The committee by authenticated power of attorney can delegate to one or more directors, to officers of the company, employees, or others the power to sign all acts and agreements mentioned hereabove.

TITLE FIFTH.—*Commissaries.*

ARTICLE 40. The general meeting of the stockholders shall appoint one or more commissaries, together or separately, invested with the functions which devolve upon them by law.

In case of absence of one of the commissaries the one or those who remain will proceed by themselves.

TITLE SIXTH.—*General meetings of stockholders.*

ARTICLE 41. A general meeting regularly organized shall represent the universality of all the shareholders.

ARTICLE 42. The general meeting shall be composed of all stockholders, owners of at least twenty shares.

It will be regularly organized when the stockholders present will represent one-quarter of the capital.

ARTICLE 43. If upon a first call the stockholders do not fill the conditions specified hereabove to validate the resolutions of the general meeting, the meeting by right shall be adjourned and the adjournment shall not be less than a month.

A second call shall be made in the manner prescribed by article 45 hereafter.

The resolutions of the general meeting of this second call shall only bear upon questions of the proceedings of the first meeting; such resolutions will be valid whatever the proportion of capital represented by the stockholders may be.

ARTICLE 44. The general meeting shall be held each year and day and at the place designated by the board of directors before June 30th.

There will an extraordinary meeting besides as often as the board of directors shall deem it advisable.

ARTICLE 45. The ordinary and extraordinary calls are made by means of a notice inserted at least one month in advance in one of the Paris newspapers designated for receiving legal notices, and also in all other foreign papers designated by the board of directors.

ARTICLE 46. Stockholders in order to have the right to attend or to be represented at the general meeting shall have to show proof at the office of the company at least five days before the meeting that they have deposited their certificates at the company's office, or at the office of a representative of the company designed for that purpose by the board of directors.

Deposits made under such conditions shall give the right for nominative card of admission.

Stockholders of nominative certificates or certificates of deposit have also the privilege to be represented at general meetings by proxies having regular power, the form of which shall be determined by the board of directors.

The proxies shall deposit their power of attorney at the office of the company within a time to be fixed by the board of directors for each meeting.

No one can act as proxy for a stockholder unless he is himself a member of the meeting.

ARTICLE 47. The general meeting shall be presided by the president or one of the vice-presidents of the board of directors, and in their absence by a director selected by the board.

The two largest stockholders present at the time of the opening of the meeting, and who will accept, shall be appointed as scrutators.

The president shall appoint the secretary.

ARTICLE 48. The resolutions at general meetings shall be adopted by a majority of votes of the members present or regularly represented.

In case of a tie the vote of the president shall be the casting vote.

ARTICLE 49. Twenty shares give the right to one vote, but the same stockholder can not possess more than ten votes, either as shareholder or as proxy.

ARTICLE 50. Secret ballots may be requested by ten members.

ARTICLE 51. The resolutions of the general meetings shall be recorded in minutes signed by the president, by the scrutators, and by the secretary.

The copies or extracts of these minutes in order to be valid before courts of justice or elsewhere shall be certified by two directors.

ARTICLE 52. In each general meeting a tally sheet of those present shall be kept. It shall contain the names and residences of the shareholders and the number of shares held by each. This sheet shall be certified by the officers of the meeting and shall remain at the office of the company.

ARTICLE 53. The order of business of the meeting shall be decided by the board of directors.

No other question than that mentioned in the order of business shall be discussed.

ARTICLE 54. The general meeting will receive the report of the board of directors upon the company's business.

The report of the commissaries shall also be read upon the situation of the company and upon the condition and of the accounts presented by the board of directors.

The accounts shall be discussed and if need be shall be approved.

The dividends to declare shall be decided.

Vacancies of directors and commissaries shall be filled.

A vote shall be taken, if need be, for the increase of the company's capital up to the amount of 300 millions, and for carrying it, if need be, to the amount of 600 millions.

Such increase of capital shall not be made unless the first stockholders are given the right of preference.

All loans by means of issues of bonds or by means of mortgages or by any other means shall be voted for.

Accounts for first installation shall be settled after the execution of the work. Meetings shall decide upon propositions made by the board of directors.

They shall consider and decide sovereignly upon all the interest of the company, and shall confer all supplementary useful powers needed upon the board of directors.

ARTICLE 55. The resolutions of a general meeting adopted according to the by-laws bind all stockholders, even such as are absent or disagreeing.

TITLE SEVENTH.—*Statement of finances—Inventory.*

ARTICLE 56. The financial year will commence July 1st and end June 30th.

The first statement of receipts and expenditures will include the time between the final organization of the company and the following June 30th.

ARTICLE 57. The board of directors shall make every quarter a summary statement of the resources and liabilities of the company.

This statement to be accessible to the commissaries.

There shall be made up, moreover, at the end of each financial year an inventory showing the value of assets and liabilities and all the active and passive debts of the company.

Such inventory to be reported to the general meeting.

TITLE EIGHTH.—*Annual accounts—Redemption—Interest—Reserve fund—Dividends.*

ARTICLE 58. During the execution of the work there shall be paid to the stockholders annually interest at 5 per cent upon the amount paid by them in conformity with article 9 here above.

Payment for such interest shall be provided for by temporary investments of funds and other accessories and, if need be, by the company's capital.

ARTICLE 59. The annual revenues of the company shall first be used for cancelling the part stipulated for its benefit to the United States of Colombia according to terms of the law of concession; the expenses of exploitation and care taking; the expenses for office management and generally for all charges; the interest and redemption of loans which may have been contracted; four-hundredths per cent of the capital applicable to the redemption fund as created by article 63 hereafter; the allotment of one-twentieth upon the profits, after the satisfaction of all the charges here above enumerated, for the creation of a reserve fund; the excess of the annual revenues, the net revenues or profits of the company to be divided.

ARTICLE 60. The net revenues or profits of the company are to be divided in the following manner:

To the shares up to amount of 5 per 100 of their capital by allotment, excepting, however, what will be stated hereafter concerning redeemed shares.

The remainder after this allotment will be divided at the rate of:

80 per 100 to shares.

15 per 100 to founders or beneficiaries mentioned under article 7 hereabove.

3 per 100 to directors.

And 2 per 100 for the creation of a fund to provide for pensions, help, indemnity, or gratuities granted by the board of directors to employes.

The redeemed shares shall only have a right to the part of the dividend exceeding 5 per 100 of the capital reimbursed on them; all that will represent interest at 5 per 100 of the capital reimbursed shall be paid to the redemption fund, which will be mentioned in article 63 hereafter.

ARTICLE 61. The payment of interest and dividend shall be made to the company's treasurer or to the representatives designated by the board of directors.

The payment of interest is to be made in two periods—the 1st of January and the 1st of July of each year.

The dividend shall be paid on the 1st of July which will follow the vote of the annual general meeting.

However, the directors when they may judge it deemed may authorize a payment on account of the dividend on the 1st of January preceding.

ARTICLE 62. The dividends and interest unclaimed at the expiration of five years after the time for payment shall be forfeited to the company.

ARTICLE 63. The redemption of the shares shall be accomplished in ninety-nine years, to begin from the starting point of the concession.

Provision is made for this redemption as mentioned in articles 59 and 60 hereabove by means of an annuity of four hundredths per cent of the company's capital and by the sums retained from the dividends of redeemed shares.

The shares to be reimbursed shall be designated by means of drawing lots in public each year at the office of the company at the time and according to the regulations made by the board.

ARTICLE 64. The numbers of shares drawn to be reimbursed shall be posted at the office of the company.

ARTICLE 65. The reimbursement of the shares drawn to be redeemed shall be made at the place selected for the payment of interest and dividends.

The holders of redeemed shares shall possess all the same rights as the holders of shares unredeemed, with the exception of the portion of the dividend representing interest at 5 per 100 of the capital which has been reimbursed to them.

ARTICLE 66. The part allotted to the founders or beneficiaries, designated in article 7 hereabove, from the annual profits of the company shall be represented by special certificates, the nature and style of which shall be determined by the board of directors.

In all cases the provisions of articles 18 and 19 hereabove concerning shares are equally applicable to the certificates of founders or beneficiaries.

ARTICLE 67. The reserve fund shall consist of accumulations of money withdrawn from the annual profits in conformity to article 59 hereabove, and is set aside to meet extraordinary and unforeseen expenses.

When this reserve fund shall attain one-tenth of the capital the allotment intended for its creation shall cease to be applied and shall be added to the dividends to be divided.

In case of insufficiency of the results in one year to allow 5 per 100 per share the difference may be drawn from the reserve fund.

TITLE NINTH.—*Changes to by-laws—Liquidation.*

ARTICLE 68. If experience should show the usefulness of making modifications or additions to the present by-laws the general meeting shall provide for them in the manner determined by articles 69 and 70 hereafter.

The meeting can especially decide upon—

The reduction of the company's capital or its increase beyond 600 millions.

The extension or the dissolution of the company.

Consolidation with other companies.

All modifications bearing upon the company's purpose can be made without, however, altering it in its essence.

ARTICLE 69. The general meetings called to deliberate upon the sundry purposes named in the preceding article shall not be regularly organized and their resolutions shall only be valid when they are composed of a number of stockholders representing at least one-half of the capital. But then the board of directors shall have the right, in its calls, to decrease as much as it may deem useful the number of shares held, which shall be sufficient for taking part in the general meetings; and in such a case the holder of a minimum number of shares sufficient to be admitted to the meeting shall have the right to one vote, the holder of ten shares shall have a right to two votes, and the number of votes will increase at the rate of one vote for each ten shares, whilst the total number of votes for each holder can not be above ten.

ARTICLE 70. It is hereby explained that it is to conform to the French law now in force that the present by-laws require the representation of one-half the company's capital in the general meetings relating to purposes specified in article 68 hereabove and the representation one one-quarter of the capital in the other general meetings.

But it is positively understood that the company would enjoy all benefits derived from all new laws which should decrease the amount of capital necessary to be represented in the general meetings and that all new legislative provisions touching upon this question will become applicable to the company created by these present upon a conform resolution of a general meeting called according to the regulations prescribed by articles 42 and 43 hereabove.

ARTICLE 71. In case of dissolution of the company upon a proposition of the board of directors, the general meeting will determine the mode to be adopted either for dissolution or for the organization of a new company. One or more liquidators shall be appointed, and the most extensive power may be granted to them.

ARTICLE 72. During the liquidation the power of the general meetings will continue as during the existence of the company.

They have especially the right to approve the accounts of the liquidator and give receipt therefor.

The appointment of liquidators will terminate the powers of the directors and of all proxies.

TITLE TENTH.—*Competency of jurisdiction—Controversies.*

ARTICLE 73. In conformity with article 20 of the law of concession, the differences which may arise between the Government of the United States of Colombia and the company shall be submitted to the federal supreme court.

But for all other controversies the company has its domicile in Paris.

ARTICLE 74. Controversies bearing upon the general and collective interest of the company can not be brought either against the board of directors or against one of its members, except in the names of stockholders representing at least one-twentieth of the capital of the com-

pany. The social initiative can not belong to a stockholder or to a group of stockholders representing less than one-twentieth of the capital.

And no action at law brought by one or more stockholders against the company, its board of directors, or one of its members can be referred to any tribunal until after it has been examined by the general meeting of the stockholders, the opinion of which will be submitted to the magistrates at the same time as the request itself.

ARTICLE 75. In cases of controversies all stockholders shall elect a domicile in Paris and all notices and summons will be validly served to the domicile by him so selected without regard to his real domicile.

Failing to select a domicile such an election shall take place with full right for judicial or extra judicial notices to the office of the procurator of the Republic at the civil tribunal of first instance of the Seine.

Domicile being elected formally or implicitly, as has been mentioned, will carry with it the competency of jurisdiction of the tribunals of the Department of the Seine.

ARTICLE 76. In all controversies which may arise between the company and third parties all judicial or extra judicial actions must of necessity be served legally upon the company by a single copy in the person of the president of the board of directors and at the office of the company.

TITLE ELEVENTH.—*Transitory provisions.*

ARTICLE 77. The subscription of the company's entire capital and the payment of at least one-quarter of the capital in specie shall be announced by a declaration of Mr. Ferdinand de Lesseps, made by a notarial act.

To this declaration is to be annexed the list of subscribers and the statement of the instalments paid.

ARTICLE 78. Such a declaration with its vouchers shall be submitted at the first regular meeting, when its correctness shall be certified to.

At the same meeting the value of the acquisitions stated above shall be verified and also the cause of the stipulated advantages.

ARTICLE 79. A second meeting shall take place to approve, if need be, the acquisitions and advantages alluded to.

This same meeting for the first period of receipts and expenditures shall appoint commissaries as created by article 40.

The minutes of the meeting will state the acceptance of the directors and commissaries if they are present at the meeting.

The company shall be organized from the time of their acceptance.

ARTICLE 80. The general meetings held for the creation of the company shall be composed of all the subscribers voting viva voce, except that the bearers of several shares are to have a vote for each ten shares, but not to have more than ten votes.

The organizing meeting shall be composed of a number of stockholders representing at least one-half of the capital. The company's capital, one-half of which must be represented for a verification of the acquisitions, shall be composed only of the acquisitions not submitted to verification.

If the general meeting is not composed of a number of stockholders representing one-half of the company's capital, none but temporary resolutions can be adopted. In such a case a new general meeting shall be called. Two notices, published at an interval of eight days, at

least one month in advance, in one of the Paris newspapers for legal notices, shall acquaint the stockholders of the temporary resolutions adopted by the first meeting, and such resolutions shall become final if they are approved by the new meeting composed of a number of stockholders representing one-fifth at least of the capital.

ARTICLE 81. All the stipulations of Title VI relative to general meetings and conciliable with those contained under the present title are applicable to organizing general meetings.

ARTICLE 82. The sum of 300 millions proposed by the proponent under article 8 of the present scheme for a company to be the amount of the company's funds is thus fixed temporarily and as a basis for the subscription to be opened.

Consequently if this amount is not subscribed in whole, the subscribers shall be notified for a preparatory meeting to determine if the purpose of the company can or can not be attained with the capital obtained by the subscription, and, in case of the affirmative, to fix in a definite and irrevocable manner the amount of the capital of the company.

To be valid such a decision should be adopted in accord with Mr. Ferdinand de Lesseps.

The subscribers present must then represent one-half of the capital subscribed and voting shall take place by the majority of subscribers present voting viva voce.

The capital being thus fixed the formalities for organization enumerated in the preceding articles shall then be gone into.

TITLE TWELFTH.—*Publication.*

ARTICLE 83. During the month of the organization of the company the directors will deposit at the office of the tribunal of commerce of the Seine and of justice of the peace of the first district of Paris:

First. A copy of the organization of the company.

Second. A copy of the act stating the subscription of the capital and the payment of one-fourth.

Third. A certified copy of the resolutions adopted at the general meeting in virtue of the articles 78 and 79 hereabove.

Fourth. A certified copy of the nominative list of the subscribers, containing their names, surnames, their business, residences, and the number of shares to each.

The same documents shall be posted up in a conspicuous manner in the offices of the company.

ARTICLE 84. During the same time an extract of the acts and resolutions mentioned in the preceding article shall be inserted in one of the Paris journals for legal notices, in conformity with law.

ARTICLE 85. All powers shall be granted to the bearer of the papers for the deposit and publication in question.

ARTICLE 86. Finally Mr. Ferdinand de Lesseps calls attention that all the stipulations contained in the two last preceding titles relative to the organization and to the publications of the present company have only been dictated owing to the exigencies of the French law for stock companies now in force.

He especially reserves the benefits of all new enactments that may be introduced by legislation in the law for the purpose of facilitating the organization of such large enterprises.

COMPAGNIE NOUVELLE DU CANAL DE PANAMA
(CORPORATION).

CAPITAL STOCK, 65 MILLION FRANCS.

7 RUE LOUIS LE GRAND, PARIS.

[Translation.]

**COMPAGNIE NOUVELLE DU CANAL DE PANAMA (CORPORATION).
CAPITAL STOCK, 65 MILLION FRANCS. 7 RUE LOUIS LE
GRAND, PARIS.**

BY-LAWS.

TITLE I.—*Formation and objects of the corporation—Style—Principal office—Duration.*

ARTICLE 1.

There is formed between the appearing promoter and the subscribers to the stock hereinafter created a commercial corporation under the style of “Compagnie Nouvelle du Canal de Panama,” in conformity to the laws of July 24, 1867, and August 1, 1893.

ARTICLE 2.

The objects of the corporation are:

First. To complete the maritime ship canal between the Atlantic and Pacific oceans.

Second. To operate the said canal and the various undertakings connected therewith.

Third. To construct and operate all railroad lines in the vicinity of the canal and to take charge of all the interests that the corporation may own or acquire in railroads already constructed.

Fourth. To work the granted lands and the mines therein.

All under the clauses and conditions of the concession as established by the law of the Congress of the United States of Colombia under date of May 18, 1878 (Law 28 of 1878), and by the extensions of the concession under dates of December 26, 1890 (Law 107 of 1890), and of April 4, 1893.

ARTICLE 3.

The principal office of the corporation is at Paris, temporarily located at Rue de la Victoire, 63 bis, and hereafter at such place as the board of directors may designate.

ARTICLE 4.

The corporation will begin on the day when it shall be finally constituted. Its duration shall be the same as that of its concession; that is to say, ninety-nine years from the day on which the canal shall be opened, in whole or in part, for public use or when the corporation shall begin to collect tolls and navigation dues.

TITLE II.—*Contributions—Corporate stock—Shares—Payments on shares.*

ARTICLE 3.

Mr. Jean Pierre Gautron, a judicial administrator near the civil tribunal of the Seine, residing in Paris, Rue Tronchet, No. 13, "acting in the name and as sole liquidator of the 'Compagnie Universelle du Canal Interoceanique de Panama,' under the powers conferred by a judgment of the civil tribunal of the Seine under date of February, 1889," has intervened in these presents:

Mr. Gautron appointed to the said office of liquidator by a judgment of the council chamber of the civil tribunal of the Seine dated July 21, 1893, who, in his above said capacity, brings to the corporation—

First. All rights whatever accruing to the company in liquidation by virtue of the laws of the Government of the United States of Colombia, under dates of May 18, 1878, and December 26, 1890, as well as of the decrees, acts, or matters that have taken place since in the operation of those laws with all the advantages stipulated in said laws and decrees, together with all the lands and real estate granted to the Inter-oceanic Company in liquidation or acquired by the said company.

All of which on condition that the provisions of the laws and extensions of the concessions shall be complied with and that all outstanding debts of the liquidation to the Colombia Government shall be discharged.

Second. The completed works, yards, workshops, buildings, hospitals, equipment whether set up or not, materials and supplies, etc., belonging to the "Compagnie Universelle du Canal Interoceanique" in liquidation, as well as all securities that may have been deposited by the said company in liquidation.

Third. The plans, estimates, surveys, documents of all kinds collected by the "Compagnie Universelle du Canal Interoceanique" and having any connection whatever with the survey, construction, or operation of the canal or of its owners, as well as the benefit of all contracts with third parties.

Fourth. All rights of every nature, shares in ownership, and others of every and whatsoever kind, that may belong to the "Compagnie Universelle du Canal Interoceanique" in liquidation in the Panama Colon Railway operated by an American company styled the "Panama Railroad Company," whose principal office is in New York, these rights being transferred such as they stand and exist, and Mr. Gautron, in his capacity, binding himself to vest this corporation therewith in the form required by the law of the United States of America.

These rights and property such as they stand and exist and in the condition in which they are.

The present corporation shall become owner of the property and rights hereby ceded and contributed on and from the day when it shall have been finally constituted; except, however, what is to be stated hereinafter in regard to the Panama Railroad.

These cession and contributions are made by Mr. Gantron under the following reservations and provisions, namely:

First. There shall be allotted to the liquidation a share of 60 per cent in the net profits of the undertaking, such profits to be determined in accordance with articles 51 and 52 hereinbelow.

Second. There shall be set apart for the Government of the United States of Colombia, in conformity to the extension law of December 26, 1890, 50,000 of the shares hereby created, said shares to be free from all liabilities.

Third. The rights of every nature on the Panama Railroad belonging to the liquidation and contributed by Mr. Gantron under section 4 of this article shall become vested in the present corporation from the day of the meeting, the convening of which is provided for under article 75 hereinafter, without any pecuniary consideration, but under the resolatory proviso that the canal shall be completed within the time stipulated in the act of concession. Should the canal not be completed within the said time, the said rights would revert to the liquidation.

If, contrary to expectation, the above-mentioned meeting should not make the requisite provisions for the completion of the canal, or, if the provisions made by the meeting could not be carried out, the said rights on the railroad would remain the property of the present corporation, but the latter would be held to pay to the liquidation a sum of 20,000,000 of francs by way of indemnity, and the share in the profits allotted to the liquidation would be one-half of the profits of the present corporation, and no amount shall be set aside out of such profits except those provided for in paragraphs 2 and 3 of article 51, hereinafter.

In consequence the said rights shall remain inalienable in the possession of the new company until the said sum of 20,000,000 shall have been paid, or until the canal shall have been entirely completed.

Fourth. Until the final completion of the canal, Mr. Gautron, in his name, shall have the faculty of appointing a supervising committee consisting of three members selected, as far as practicable, among the Government engineers for bridges and highways and treasury inspectors, who will look into the progress of the work, the condition and conservancy of the equipment and buildings, as well as the books appertaining thereto.

The compensation of this committee shall be charged to the new company.

ARTICLE 6.

The corporate stock is fixed at 65,000,000 francs, divided into 650,000 shares of 100 francs each.

Out of these 650,000 shares, 50,000 entirely free from any liability, shall be allotted to the Government of the United States of Colombia in conformity to the extension law of December 27, 1890, as stated in the foregoing article.

As to the remaining 600,000 shares, they shall be subscribed to in cash.

The corporate stock may be increased once or from time to time by a resolution of the regular general meeting and on the motion of the board, by means of additional shares.

ARTICLE 7.

The 50,000 shares allotted to the Government of the United States of Colombia, although entirely free from all liabilities, shall not be entitled to interests or dividends except on the same terms as those governing subscribed shares.

These 50,000 shares shall remain attached to their respective stubs and shall be negotiable in accordance with the provisions of article 2 of the French law of August 1, 1893, and the concession laws.

ARTICLE 8.

There is reserved for the benefit of the stock and bond holders of the "Compagnie Universelle du Canal Interocéanique" in liquidation, a preferential right to subscribe to one-half of the present stock of this corporation and to the whole of subsequent issues.

ARTICLE 9.

The amount of each share is to be paid in cash into the corporate treasury or to such agents as may be designated by the new company to receive subscriptions.

Payments can be demanded as follows: Twenty-five francs immediately upon subscribing; 25 francs on October 15, 1894; and the remainder whenever called for by the board of directors.

Payments shall be made in accordance with the calls issued by the board through notices published one month in advance in one of the Paris newspapers designated to receive legal announcements.

Every stockholder, however, shall be permitted to anticipate full payment of his shares at any time.

ARTICLE 10.

Acknowledgment of the first payment shall be made by means of a receipt in the name of the subscriber which shall, within two months after the organization of the corporation, be exchanged for a provisional certificate, also in the subscriber's name.

All subsequent payments, except the final one, shall be entered on this provisional certificate.

The final payment shall be effected upon the delivery of the actual shares which can be made registered or coupon at the option of the stockholder.

ARTICLE 11.

The board of directors shall determine the form and type of the shares.

All the certificates, whether provisional or final, shall be detached from a stub book; they shall bear a serial number and the dry seal of the corporation; they shall be signed by two directors or by one director and a delegate of the board of directors.

ARTICLE 12.

All delayed payments on calls for funds shall, as a matter of right, bear interest at the rate of 6 per cent per annum, from the day when they were to be made, for the benefit of the company.

And in the event of default of payment during the month when it should be made, the board of directors shall have the option of either taking all and any actions at common law, or cause the sale of certificates that are not paid in full.

Such a sale can be effected fifteen days after publication of a notice in the "Journal Officiel" or any of the other newspapers in the Department of the Seine designated to make legal announcements. It shall be done at the delinquent's risk and peril through a stock broker of the Paris Exchange or through a notary at the option of the board of directors.

The certificates of shares thus sold shall be canceled and superseded by a new certificate in the name of the purchaser and bearing the same number.

The proceeds of the sale shall be deducted for their proper amount from the sums due to the corporation by the subscriber and his representatives who shall all be held jointly liable for the difference, but shall have the benefit of any surplus.

ARTICLE 13.

The shares shall be registered until they shall have been fully paid up in accordance with the law of August 1, 1893.

Moreover, no share shall be negotiated, nor will its transfer be authorized by the board of directors as long as it shall not have been fully paid up.

This inhibition, however, shall not apply to shares of subsequent issues.

Holders of coupon shares shall at all times have the right to ask that coupon shares be converted into registered shares.

ARTICLE 14.

Shares entitle the holder to a proportional share in the ownership of the corporation's assets, in the profits to be distributed as interests or dividends and in the reserve fund.

Interests and dividends shall be paid to the holder either on presentation of the share, said share being stamped, in the case of registered shares, or on presentation of the coupons, in the case of coupon shares, at the principal office of the corporation, at such times as may be set by the board of directors.

ARTICLE 15.

The transfer of coupon shares is effected by mere delivery.

That of registered shares takes place by means of a declaration of transfer entered in the books of the corporation and subscribed by both the transferer and transferee or by their attorneys.

The costs of transfer, mutations, and conversions are to be borne by the new holders.

ARTICLE 16.

The board of directors may authorize the safe-keeping and deposit of coupon shares in the treasury of the corporation. It will, in that event, decide upon the form of deposit certificates by name, the terms of delivery, and the guaranties that must, in the interest of the corporation and of the stockholders, accompany the execution of this measure.

ARTICLE 17.

Stockholders are liable for the obligations of the corporation to the amount of stock held by them, and no more.

In no event can there be made a call for funds exceeding the amount of the shares.

ARTICLE 18.

Shares are indivisible as regards the corporation, which will only recognize one owner for each share.

All the joint owners of a share must be represented near the corporation by one and the same person.

ARTICLE 19.

The rights and liabilities appertaining to the share follow the certificate, in whichever hands it may happen to pass.

The ownership of a share involves, as a matter of right, adhesion to the by-laws of the corporation, as well as to all and any resolutions of the general meeting.

The heirs, creditors, or representatives of a stockholder can not, on any grounds, demand a division or licitation, procure an injunction, cause the books, records, papers, and securities of the corporation to be sealed, or intermeddle with the management of its affairs.

For the exercise of their rights they shall exclusively rely on the inventories of the corporation, the resolutions of the general meeting, and the decisions of the board of directors.

TITLE III.—*Board of directors.*

ARTICLE 20.

The affairs of the corporation shall be managed by a board consisting of not less than nine members and not more than fifteen members, selected among the copartners.

ARTICLE 21.

The directors do not assume, by reason of their office, any personal or joint obligations. They are responsible for the proper discharge of their duties only.

ARTICLE 22.

The directors are appointed by the general meeting of stockholders for a term of not more than six years.

If the board should consist of nine, twelve, or fifteen members, it will be renewed every other year and by lot during the first term of six years, thereafter by length of service.

If the number of directors was not as above indicated, it would be for the general meeting to decide concerning the renewal of the board and the term of service of the directors.

Outgoing directors may always be reelected.

The second general constituent meeting shall determine how many members there shall be on the first board, and shall proceed to elect them.

The said first board will, if it deems it expedient, be permitted to call in additional members within the limits above stated, and shall cause the appointments thus made to be ratified by the first regular general meeting.

ARTICLE 23.

In case of any vacancy through resignation or death the board of directors shall temporarily provide a successor until the next general meeting of the stockholders.

Directors thus appointed shall remain in office no longer than the unexpired term of their predecessors.

ARTICLE 24.

Every director must be the owner of 250 registered and inalienable shares. These shares shall be stamped so as to show that they are inalienable, and shall remain in the custody of the corporate treasury during the whole term of the owner.

These shares shall be held as a guaranty of all official acts.

ARTICLE 25.

The board of directors shall elect every year a president and, if need be, one vice-president or more among its members.

The president and the vice-presidents can always be reelected.

In the absence of the president, vice-president, or vice-presidents, the board shall at each meeting designate one of its members to discharge the duties of president.

ARTICLE 26.

The board of directors shall meet at least once every month. It shall also meet at the call of the president as often as the interests of the corporation may require it.

The resolutions shall be passed by a majority vote of members present.

If the votes be equally divided, that of the president shall be decisive.

Not less than five directors must be in attendance in order to make the board's resolutions valid.

When not more than five or six directors are present, resolutions, in order to be valid, shall have to be carried by a majority of four votes.

No one shall be allowed to vote by proxy in the board.

ARTICLE 27.

The proceedings of the board of directors are made of record by means of minutes signed by the president and one of the members in attendance.

Copies or extracts of these minutes must, in order to be valid in court or elsewhere, be certified by the president or by two directors.

ARTICLE 28.

The board of directors is vested with the most extensive powers to conduct and manage the business of the corporation, to select and develop the Government lands granted by paragraphs 7 and 8 of article 1, and by article 4 of the concession law.

The board of directors may apply for all and any additional concessions, enter into contracts with third parties for the purchase of enterprises or concessions connected with any of the objects of the corporation.

It appoints and removes the employees, assigns to them their duties and powers, determines their salaries and gratuities.

It allows and regulates expenses.

It signs the mail as well as all notes, indorsements, drafts, orders, transfers, and conversions of securities, public and otherwise, owned by the corporation, it contracts for and allows all advances of money.

It takes all financial measures that may be necessary for the advancement of the corporation, and assumes all loans that need not be authorized by the general meeting.

It lays before the general meeting all propositions concerning mortgages and issues of bonds.

It administers upon the rights in the Panama Railroad brought to the corporation under the provisions of article 5.

It prepares for the general meetings the order of business and the accounts that are to be submitted to them; it presents to each general meeting a report on the accounts and condition of the affairs of the corporation.

It temporarily determines the amount of the dividends and declares, if there be occasion therefor, how much of the dividend for the fiscal year closed with the inventory of the preceding 30th of June shall be paid on the 1st of July.

It passes upon the following matters, to wit:

First. Calls for funds on the shares.

Second. Provisional investment of available funds.

Third. Surveys and projects, plans and estimates for the execution of works.

Fourth. Agreements and contracts for works of various kinds, jobs and bids not affecting the works.

Fifth. Leases, sales, rents, and exchanges of property, whether real or personal, purchase and hiring of vessels and machinery required for the execution of the works and the development of the enterprise.

Sixth. Annual estimates of revenues and expenditures.

Seventh. Determination and modifications of the dues of all descriptions to be collected under the concession terms and method of collection of the tariffs.

Eighth. Disposal of the reserve funds.

Ninth. Regulations for the deposit of shares and bonds of the corporation.

It prosecutes the collection of dues and the recovery of all outstanding debts, gives all quittances and releases, assents to all replevins or mortgages, attachments, injunctions, and other impediments, with renunciation of privilege, mortgage, and resolatory action, all of which before or after payment. It assents to all priorities.

It authorizes all actions at law, either as plaintiff or defendant, it negotiates, composes, and compromises in respect to said actions as well as to all the business of the corporation.

Generally it takes, in the interest of the corporation, all actions that it may deem necessary or expedient, the foregoing powers being merely an enunciation and not a limitation of the rights of the board of directors.

ARTICLE 29.

The board of directors may delegate its powers, in whole or in part, for the general management of the corporation, to one or more of its members with the title of delegate director, or to one manager or sub-manager or more of them not members of the board.

It may also delegate its powers, in whole or in part, to one or more of the directors, or to one of the employees of the corporation, or to one person or more not connected with the corporation, by means of a special power of attorney for one or more well defined transactions or purposes.

ARTICLE 30.

The directors shall receive for their compensation, apart from the share in the profits settled in article 52, attendance checks, the value of which shall be determined by the general meeting, and which it shall be the duty of the board of directors to distribute among its members.

TITLE IV.—*Technical committee.*

ARTICLE 31.

The board of directors is authorized to avail itself of the assistance of a technical committee, whose members shall be selected among competent persons conversant with public works and notably among retired inspectors-general of bridges and highways and of the treasury.

This committee shall, after receiving communications from the board of directors, give its opinion, with the grounds therefor, on questions bearing on the execution of the works.

The board of directors shall decide how many members shall be on the technical committee and how they shall be compensated.

TITLE V.—*Commissioners.*

ARTICLE 32.

The general meeting of stockholders shall appoint one commissioner or more, whether copartners or not, who shall be vested with the powers conferred upon them by law.

If one of the commissioners should be hindered, the other commissioner or commissioners may act without him.

The commissioners shall be allowed a compensation by the general meeting.

TITLE VI.—*General meeting of the stockholders.*

ARTICLE 33.

The general meeting, when regularly constituted, shall represent the whole body of the stockholders.

ARTICLE 34.

The general meeting consists of all the stockholders owning not less than ten shares.

Further, all holders of less than ten shares may combine to make up the required number, and have themselves represented by one of their number, in accordance with the law of August 1, 1893.

The meeting shall be regularly constituted when one-quarter of the corporate stock shall be represented by the attending stockholders.

ARTICLE 35.

When the attending stockholders shall not, at the first call, fulfill the conditions above set forth for the validity of the proceedings of the general meeting, the meeting shall be adjourned as a matter of right, and the adjournment shall not be for less than twenty days.

A second call shall be issued in the form prescribed by article 37. herein below.

The proceedings of the general meeting at this second session shall not bear on any other question than those set forth in the order of business of the first. The proceedings shall be valid, whatever may be the portion of the corporate stock represented by the shareholders.

ARTICLE 36.

The general meeting takes place every year at such time and place as may be designated by the board of directors prior to December 31.

Further, there shall be special meetings whenever deemed expedient by the board of directors.

ARTICLE 37.

Regular and special calls are made by means of a notice published at least twenty days beforehand in one of the Paris newspapers designated to receive legal notices.

ARTICLE 38.

In order to attend or be represented at the general meeting, stockholders shall, at least five days before the meeting, show proof at the principal office of the corporation that they have deposited their certificates in the treasury of the corporation or in that of one of the institutions designated for the purpose by the board of directors.

Deposits thus effected entitle the depositors to a personal card of admission.

Holders of registered stock or of certificates of deposit shall have the faculty of being represented at the general meetings by proxies furnished with regular powers, the form of which shall be determined by the board of directors.

The proxies shall file their powers in the principal office of the corporation within the time fixed by the board of directors for each meeting.

No one will be allowed to represent a stockholder at the meeting unless he be himself a member of such meeting.

Married women, however, may be represented by their husbands if the latter administer upon their rights and acts; in like manner, minor children and persons adjudged incompetent may be represented by their guardians.

Usufructuaries and owners must be represented by either one furnished with the power of attorney of the other or by a common proxy, himself a member of that meeting.

Stockholding companies, as well as the Government of Colombia, may be each represented by a delegate who may not be himself a stockholder.

ARTICLE 39.

The president or one of the vice-presidents of the board of directors, or, in their absence, a director designated by the board, shall preside at the general meeting.

The two stockholders owning the greatest number of shares who are present at the time when the session is declared opened and who accept that office, are appointed scrutineers.

The board of officers appoint the secretary.

ARTICLE 40.

Resolutions of the general meeting are passed by a majority vote of the members present or regularly represented.

In case of an equal vote, the president's vote is decisive.

ARTICLE 41.

Ten shares entitle to one vote. One stockholder can not cast more than 200 votes either as a stockholder or a proxy.

ARTICLE 42.

A secret ballot may be demanded by ten members representing not less than 200 votes.

ARTICLE 43.

The proceedings of the general meeting are recorded by means of minutes signed by the president, the scrutineers, and the secretary.

Copies of or extracts from those minutes, in order to be valid exhibits in court or elsewhere, must be certified by the president and two directors.

ARTICLE 44.

There shall be kept at each general meeting an attendance roll, in which shall be set forth the names and addresses of the stockholders and the number of shares held by each one of them. The roll shall be certified by the board of officers of the meeting and placed on the files of the principal office of the corporation.

ARTICLE 45.

The order of business before the general meeting is settled by the board of directors.

No other question than those entered in the order can be brought up for discussion.

ARTICLE 46.

The general meeting has the report of the board of directors on the corporate business read to it.

It also has the report of the commissioner or commissioners on the condition of the corporation on the balance sheet and on the accounts submitted by the board of directors read to it.

It discusses and, if there be occasion, approves the accounts.

It authorizes, on the motion of the board of directors, the creation of all special reserve funds and additional sinking funds that may be found advisable.

Exceptionally, it shall pass upon the decision to be taken agreeably to article 75 hereinafter.

ARTICLE 47.

The resolutions of the general meeting, passed in accordance with the by-laws, shall bind all the stockholders, even though not present or dissentient.

TITLE VII.—*Statements of condition—Inventories.*

ARTICLE 48.

The fiscal year of the corporation shall begin on the 1st of July and end on the 30th of June.

The first fiscal year shall cover the lapse of time between the final organization of the corporation and the 30th of June, 1895.

ARTICLE 49.

A brief statement of the resources and liabilities of the corporation shall be drawn up every half year by the board of directors.

This statement shall be placed at the disposal of the commissioner or commissioners.

ARTICLE 50.

In addition, there shall be made at the close of every corporate year an inventory setting forth all the real and personal property and all the debts due to and by the corporation.

This inventory shall be laid before the general meeting.

TITLE VIII.—*Annual accounts—Amortizations—Interest—Reserve funds—Dividends.*

ARTICLE 51.

The annual proceeds of the enterprise are to be first used in satisfying—

First. The participation stipulated by the Government of the United States of Colombia for its benefit, under the provisions of the concession law.

Second. The expenses of maintenance and operation, the costs of management, and generally all corporate charges; the interest and amortization of all loans that may have been contracted.

Third. The setting aside of one-twentieth of the net profits, after meeting all the above-mentioned liabilities, for the purpose of establishing the reserve fund required by law.

Fourth. Five per cent of the corporate stock, the proceeds of which shall be appropriated by the general meeting, on the motion of the board of directors, for the creation of a sinking fund which shall be provided for in article 55 hereinafter, and also for the payment of interest on unredeemed shares.

ARTICLE 52.

The surplus of the annual proceeds, after the various deductions provided for in the foregoing article, shall constitute the net proceeds or profits of the enterprise.

Five per cent of such profits shall be set aside for the benefit of the board of directors of the corporation.

The remainder shall be apportioned as follows:

Up to 40 per cent to the shares in existence;

And up to 60 per cent to the "Compagnie Universelle du Canal Interocéanique" in liquidation.

ARTICLE 53.

The payment of interests and dividends shall be effected at the corporate treasury or by agents designated by the board of directors.

The payment of interests shall be made in two installments: On the 1st of January and the 1st of July of each year.

The dividends shall be paid on the 1st of January following the vote of the annual general meeting.

The board of directors, however, may, when it deems it feasible, authorize the payment of a dividend on account on the preceding 1st of July.

ARTICLE 54.

Interests and dividends, when not claimed after five years from the day when they should have been paid, shall revert to the corporation.

ARTICLE 55.

The amortization of the shares shall be completed in ninety-nine years from the time when the canal shall be put in operation.

This amortization shall be provided for by means of the fund set aside, as hereinbefore stipulated under article 51, and the amount of which shall be determined by the general meeting on the motion of the board of directors.

The shares to be redeemed shall be designated by means of a drawing by lot, which shall take place every year publicly at the principal office of the corporation, at such times and in such manner as the board of directors shall determine.

ARTICLE 56.

The numbers of the shares drawn by lot for redemption shall be posted at the principal office of the corporation.

ARTICLE 57.

The payment of shares drawn by lot for redemption shall be effected at the places designated for the payment of interests and dividends.

Holders of redeemed shares remain in possession of the same rights as the holders of unredeemed shares, with the exception of the interests that might accrue to them under the provisions of article 51 above.

ARTICLE 58.

The share of 60 per cent allotted to the "Compagnie Universelle du Canal Interocéanique" in liquidation may, if the liquidator should so request, be represented by shares in such numbers as he may decide should be delivered to him; but it shall be for him to distribute the same among the interested parties in accordance with their rights.

This right to a share in the profits shall not give to any of those who may be entitled to enjoy it any right to meddle in any manner whatsoever with the acts or management of the corporation.

At all events the provisions of articles 18 and 19 above, in regard to shares, are equally applicable to beneficiary shares.

All costs and formalities appertaining to these shares are incumbent on the holders thereof.

Before proceeding to distribute these shares the liquidator shall have to organize their representation in the new corporation; such organization will have to receive the recognition of the board of directors of the present corporation.

ARTICLE 59.

The reserve fund shall consist of the accumulation of the sums set aside out of the annual profits, as provided in article 51 above.

Whenever the reserve fund shall amount to one-tenth of the corporate stock, the setting aside of sums intended for its creation may be suspended. It shall be resumed as soon as the amount of the reserve fund shall become less than one-tenth of the corporate stock.

TITLE IX.—*Amendments to the by-laws—Liquidation.*

ARTICLE 60.

If experience should disclose the expediency of amending or amplifying the present by-laws, the general meeting shall provide therefor in the manner set forth in articles 61 and 62 hereinafter.

It may decide notably in regard to—

A reduction of the capital stock.

A reduction of the duration, an extension, or an earlier dissolution of the corporation.

Its fusion with other corporations.

It may even effect all and any modifications bearing on the objects of the corporation without, however, altering their essentials.

ARTICLE 61.

The meetings before which the various objects recited in the foregoing article shall come up for discussion shall not be regularly con-

stituted and their resolutions shall not be valid unless they are attended by a number of shareholders representing not less than one-half of the capital stock; but in such a case the board of directors shall have the right to make, in the notices calling the meetings, the number of shares required to entitle the holder to a seat in the meeting, as small as it may deem expedient; and, in this event, the bearer of the minimum number of shares sufficient for a seat in the meeting shall have one vote; the bearer of ten shares shall have two votes, the number of votes increasing at the rate of two votes for ten shares, provided that every individual member shall not have more than two hundred votes.

Further, all holders of a number of shares less than that set for admission to the meeting may come together to make up the required number and have themselves represented by one of themselves in accordance with the law of August 1, 1893.

ARTICLE 62.

Explanation is here made that these by-laws require that one-half of the corporate stock shall be represented in the general meetings relative to the objects specified in the foregoing article 60, and one-quarter of the corporate stock shall be represented in the other general meetings, so that the present requirements of the existing French law shall be complied with.

But it is distinctly understood that the corporation would avail itself of the benefit of any new legislation that might lessen the amount of corporate stock that must necessarily be represented in general meetings and that the new provisions of law governing this question would be made applicable to the corporation hereby created, upon the suitable resolution of a general meeting convened under the rules set forth in the foregoing articles 34 and 35.

ARTICLE 63.

In the event of a dissolution of the corporation, the general meeting shall, on the motion of the board of directors, determine what course shall be adopted either to dissolve or to reorganize a new corporation; it shall appoint one liquidator or more and may vest them with the most extensive powers.

ARTICLE 64.

During the liquidation the powers of the general meeting shall continue the same as during the existence of the corporation.

It shall notably have the right to approve the accounts of the liquidation and to give quittance therefor.

The powers of the directors and of all the mandatories shall terminate upon the appointment of the liquidators.

TITLE X.—*Attributions of jurisdiction—Controversies.*

ARTICLE 65.

In conformity to article 20 of the concession law of May 18, 1878, all differences that may arise between the government of the United

States of Colombia and the corporation shall be brought before the federal supreme court.

But in regard to all other controversies the domicile of the corporation is in Paris.

ARTICLE 66.

The corporation shall be considered as a commercial one, both in essence and in form, and therefore subject to the jurisdiction of the tribunal of commerce of the Seine.

ARTICLE 67.

Litigation affecting the general and joint interests of the corporation can only be brought against either the board of directors or any one of its members in the name of stockholders representing not less than one-twentieth of the corporate stock; corporate action can not appertain to one stockholder or to a group of stockholders representing less than one-twentieth of the corporate stock.

And no action at law brought against the corporation, its board of directors, or one of its members by one stockholder or more shall be submitted to the courts except after being examined by the general meeting of stockholders, whose opinion shall be laid before the court, together with the brief itself.

ARTICLE 68.

In case of litigation every stockholder must elect residence in Paris, and all notices and writs will be validly served at the residence so elected, without regard to the distance of the actual residence.

If he should fail so to elect residence such election will, as a matter of right, be held to have been made for the purpose of judicial and extrajudicial notices in the office of the prosecuting attorney of the civil tribunal of first instance of the Seine.

Formal or implied election of residence, as above stated, will confer jurisdiction on the competent courts of the department of the Seine.

ARTICLE 69.

In all litigations that may arise between the corporation and outsiders all judicial and extrajudicial notices must necessarily be served on the corporation in one original and in the person of the president of the board of directors, at the principal office of the corporation.

TITLE XI.—*Temporary provisions.*

ARTICLE 70.

The subscription to the whole of the corporate stock and the payment of one-quarter, at least, of the capital that consists in cash shall be proved by means of the promoter's declaration embodied in a notarial instrument.

A list of the subscribers and a statement of the payments effected shall be appended to the declaration.

ARTICLE 71.

That declaration, together with the accompanying vouchers, shall be submitted to the first general meeting, which will verify its truth.

The same meeting shall arrange for the appraisement of the contributions hereinbefore specified and of the consideration for the advantages as stipulated.

ARTICLE 72.

A second meeting shall be called for the purpose of approving, if there be occasion, the contributions and advantages above referred to.

The same meeting shall appoint the directors and commissioners ordained under article 32.

The minutes of the sitting shall record the acceptance of the directors and commissioners.

The corporation shall be held to be organized from the moment of such acceptance.

ARTICLE 73.

General meetings called for the purpose of organizing the corporation shall consist of all the stockholders, who shall have an individual vote each; but bearers of a number of shares shall be entitled to one vote for every ten shares; provided, however, that they shall not have more than ten votes.

Constituent meetings must consist of a number of stockholders representing not less than one-half of the corporate capital. The corporate capital, of which one-half is to be represented for the purpose of ascertaining the contributions, shall consist only of such contributions as are not subject to the said ascertainment.

If the general meeting should not comprise a number of stockholders representing one-half of the corporate capital, it can pass but a provisional resolution. In such an event a new meeting shall be called.

Two notices, published at an interval of eight days, at least one month in advance, in one of the Paris newspapers making legal announcements, shall acquaint the stockholders with the provisional resolutions passed by the first meeting, and these resolutions shall become final if approved by the new meeting comprising a number of stockholders representing not less than one-fifth of the corporate capital.

ARTICLE 74.

All the provisions under Title VI relative to general meetings and consistent with those included in this title shall be applicable to constituent general meetings.

Exceptionally, constituent general meetings may be convened after publication of a notice in one of the legal announcement newspapers of Paris, as follows:

Two days in advance for the first meeting.

Not less than ten days in advance for the second meeting.

ARTICLE 75.

When the actual outlay, whether for work done on the canal or for satisfaction of the liabilities resulting from the contributions of Mr. Gautron, in his names, shall amount to about one-half of the corporate

cash capital at least, a special technical committee, previously convened, in due time shall give an opinion upon the results of the works already completed and the consequences that may be inferred therefrom for the prosecution of the enterprise.

This committee shall consist of two members appointed by the board of directors of this corporation and of two persons appointed by the liquidation of the former "Compagnie Universelle du Canal Interocéanique." These four members shall designate a fifth one, who shall be chairman of the committee, and in the event of their failing to agree the said chairman shall be appointed by the president of the tribunal of commerce of the department of the Seine.

It shall be the duty of the board of directors to publish the opinion of the said committee and to call a special general meeting, as provided in articles 61 and 62 above.

That meeting shall deliberate on the ways and means tending to insure the completion of the work and on the stipulations set forth hereinabove in article 5, § 4, No. 3.

TITLE XII.—*Publications.*

ARTICLE 76.

Within one month after the organization of the corporation the directors shall file in the clerks' offices of the tribunal of commerce of the Seine and of the justice of the peace of the ninth district—

First. A duplicate of the articles of partnership.

Second. A duplicate of the instrument attesting the subscription to the stock and the payment of one-quarter thereof.

Third. A duplicate or certified copy of the two resolutions passed by the general meeting by virtue of articles 71 and 72 above.

ARTICLE 77.

Within the same period of time an abstract of the instruments and resolutions specified in the foregoing article shall be published in one of the legal announcement newspapers of Paris in accordance with the law.

ARTICLE 78.

The bearer of the documents shall be given full powers to file and publish them as above stated.

ARTICLE 79.

Lastly, attention is called to the fact that all the provisions embodied in the foregoing last two titles relative to the organization and publications of the present corporation have been dictated by no other cause than the requirements of the French law now in operation regarding corporations.

Express reservation is hereby made of the benefit derived from all new provisions that may be brought into the law by the legislators.

POLITICAL CONSTITUTION OF COLOMBIA.

POLITICAL CONSTITUTION OF COLOMBIA.

TITLE I.

OF THE NATION AND THE TERRITORY.

ARTICLE 1. The Colombian nation is reorganized as a centralized republic.

ART. 2. The sovereignty resides essentially and exclusively in the nation, and from it emanate the public powers which shall be exercised within the limits prescribed by this Constitution.

ART. 4. The territory, together with the public property therein contained, belongs exclusively to the nation.

TITLE II.

OF THE INHABITANTS: NATIVE AND FOREIGN.

ART. 10. It is the duty of all citizens and foreigners in Colombia to live in submission to the Constitution and the laws, and to respect and obey the authorities.

TITLE V.

OF THE NATIONAL POWERS AND THE PUBLIC SERVICE.

ART. 57. All public authorities shall be limited, and shall perform their respective functions independently.

ART. 58. The law-making power shall be vested in a congress. The congress shall be composed of a Senate and a House of Representatives.

ART. 60. The judicial power shall be exercised by a supreme court, by superior district tribunals, and by such other tribunals and inferior courts as may be established by law.

TITLE VI.

OF THE ASSEMBLING AND FUNCTIONS OF CONGRESS.

ART. 76. Congress shall make the laws.

IV. To regulate the administration of Panama.

IX. To authorize the Government to make contracts, negotiate loans, alienate national property, and exercise other functions within constitutional limits.

XIV. To approve or reject contracts or agreements entered into by the president of the Republic with private persons, companies or political corporations, in which the national treasury is interested, if they have not been previously authorized, or if the formalities prescribed by congress have not been complied with, or if any conditions contained in the law authorizing them have been disregarded.

XVII. To decree the execution or continuance of public works and the erection of public monuments.

XX. To approve or reject treaties entered into by the Government with foreign powers.

XXII. To limit or regulate the appropriation or conveying of public lands.

TITLE VIII.

OF THE SENATE.

ART. 98. The Senate shall also be invested with the following powers:

VII. To permit the passage of foreign troops through the territory of the Republic.

TITLE XI.

OF THE PRESIDENT AND VICE-PRESIDENT OF THE REPUBLIC.

ART. 118. The president of the Republic shall exercise the following powers in relation to the legislative department:

I. To open and close the ordinary sessions of congress.

II. To convene congress in extraordinary sessions for serious reasons of public convenience and after previous consultation with the council of state.

III. To present to congress at the beginning of each legislature a message on the acts of the administration.

IV. To send at the same time to the House of Representatives the budget of the revenues and expenses, and a general account of the budget and the treasury.

V. To give to the houses of the legislature such information as they may call for on affairs not requiring secrecy.

VI. To furnish efficient aid to the houses when they demand it, placing at their disposal, if necessary, the public force.

VII. To cooperate in the enactment of laws, by presenting bills through the medium of the ministers, exercising the right to veto legislative acts, and complying with the duty to approve them, in accordance with this Constitution.

VIII. To issue decrees that shall have the force of legislative enactments, in such cases and with such formalities as are prescribed in Article 121.

ART. 120. The president of the Republic, as the chief executive officer of the nation, shall exercise the following power:

X. To direct diplomatic and commercial relations with other powers and sovereigns, to appoint at his pleasure and receive the respective agents, and to negotiate treaties and conventions with foreign powers.

All treaties shall be submitted for the approval of congress, and the conventions shall be approved by the president, in the recess of the house, a favorable judgment of the ministers of the council of state having been previously obtained.

TITLE XVIII.

OF THE DEPARTMENTAL AND MUNICIPAL ADMINISTRATION.

ART. 185. The assemblies shall direct and encourage, by means of ordinances and with the resources belonging to the department,

primary education and charities, the industries already established and the introduction of new ones, immigration, the importation of foreign capital, the colonization of lands belonging to the department, the opening of roads and navigable canals, the construction of railways, the utilization of forests belonging to the department, the improvement of rivers, matters relating to the local police, the superintendence of the revenues and expenses of the districts, and generally whatever relates to local interests and internal progress.

ART. 188. The property, rights, values and shares which, by law, or by decrees of the national government, or by any other title, belonged to the late sovereign States, are hereby conveyed to the respective departments and shall belong to them during their legal existence.

The immovable property specified in Article 202 is not included in this conveyance.

BOGOTA, *August 4, 1886.*

REPORT
OF THE
ISTHMIAN CANAL COMMISSION.

S. DOC. 123, FIFTY-SEVENTH CONGRESS, FIRST SESSION.

REPORT OF THE ISTHMIAN CANAL COMMISSION.

MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

THE REPORT OF THE ISTHMIAN CANAL COMMISSION UPON THE PROPOSITION OF THE NEW PANAMA CANAL COMPANY TO SELL AND DISPOSE OF ALL ITS RIGHTS, PROPERTY, AND UNFINISHED WORK TO THE UNITED STATES.

JANUARY 20, 1902.—Read; referred to the Committee on Interoceanic Canals and ordered to be printed.

To the Senate and House of Representatives:

I transmit herewith a report of the Isthmian Canal Commission upon the proposition of the New Panama Canal Company to sell and dispose of all its rights, property, and unfinished work to the United States for \$40,000,000.

THEODORE ROOSEVELT.

WHITE HOUSE, *January 20, 1902.*

The PRESIDENT:

The undersigned, the Secretary of State, has the honor to lay before the President a copy of a letter from Rear-Admiral John G. Walker, United States Navy, president of the Isthmian Canal Commission, transmitting a report of the Commission upon the proposition of the New Panama Canal Company to sell and dispose of all its rights, property, and unfinished work to the United States for \$40,000,000.

Respectfully submitted.

JOHN HAY.

DEPARTMENT OF STATE,

Washington, January 20, 1902.

DEPARTMENT OF STATE, ISTHMIAN CANAL COMMISSION,
Washington, D. C., January 18, 1902.

SIR: I have the honor to transmit herewith a report of this Commission upon the proposition of the New Panama Canal Company to sell all of its rights, property, and unfinished work to the United States for \$40,000,000.

I am, sir, with great respect, your obedient servant,

J. G. WALKER,
President of Commission.

The SECRETARY OF STATE,
Washington, D. C.

DEPARTMENT OF STATE, ISTHMIAN CANAL COMMISSION,
Washington, D. C., January 18, 1902.

The PRESIDENT OF THE UNITED STATES.

SIR: The Isthmian Canal Commission has the honor to submit the following report upon the proposition of the New Panama Canal Company to sell and dispose of all its rights, property, and unfinished work to the United States for \$40,000,000.

At a meeting of the stockholders of the New Panama Canal Company held on the 21st of December last full power was given to the board of directors of the company to negotiate for the transfer of its property, concessions, and unfinished work to the United States, its action to be subject to formal ratification by the stockholders. In accordance with this action the board indicated its desire, through its representative in this city, to offer a proposition to make such transfer to the United States for the price mentioned. Thereupon by your oral direction the president of the Commission conferred with Mr. Edouard Lampre, secretary-general of the New Panama Canal Company. He also received several cablegrams from Mr. Marius Bo, the newly chosen president of the company in Paris. The results of these conferences and communications have been considered at a meeting of the Commission called for that purpose.

The first cablegram was dated in Paris on the 4th of January, and it stated that the company was ready to transfer to the United States its property and concessions for \$40,000,000, and that the offer would remain open until the 4th of March, 1903. As it was not clear whether this offer included all the property of the company, further correspondence ensued, and it was made clear that the proposition was intended to cover the entire property of the company upon the Isthmus of Panama, all the stock of the Panama Railroad Company held for its use and benefit, and the maps, plans, archives, and records in Paris.

A communication and explanatory documents, duly certified, contain-

ing a fuller statement than is embraced in the cablegrams, but to the same effect, are on their way to the United States by mail, and copies of them have been deposited with the ambassador of the United States in Paris, who has acknowledged their receipt by cable to the Secretary of State.

The cablegrams received are as follows:

PARIS, January 4, 1902—8.53 a. m.

BOEUFVE, Washington.

Inform Admiral Walker immediately, and without awaiting Lampre's arrival, that the company declares itself ready to transfer to the Government of the United States, on payment of \$40,000,000, its properties and concessions, estimated at that amount by the Isthmian Canal Commission in its last report, page 103, in conformity with the terms and conditions of the estimates of said report.

Bo,
President of the Board.

PARIS, January 9, 1902—4.07 p. m.

Admiral WALKER,

President Isthmian Canal Commission,

Corcoran Building, Washington.

The New Panama Canal Company declares that it is ready to accept for the totality, without exception, of its property and rights on the Isthmus the amount of \$40,000,000, the above offer to remain in force up to March 4, 1903.

Bo,
President of the Board.

PARIS, January 11, 1902—4.17 p. m.

Admiral WALKER,

President Isthmian Canal Commission,

Corcoran Building, Washington.

Offer of sale of all our property applies also to all maps and archives in Paris.

Bo,
President of the Board.

PARIS, January 14, 1902—9.45 p. m.

Admiral WALKER,

President Isthmian Canal Commission,

Corcoran Building, Washington.

We send by mail letter confirming cable 11th January, and, under registered package, judgment August 2, agreement with liquidator, and three extracts showing powers of board. All these documents are certified to by the United States consulate-general.

Bo,
President of the Board.

The "totality, without exception, of its property and rights on the Isthmus," mentioned in the cablegram of January 9, includes the following classes of property:

1. Lands not built on. There are 56 parcels of land to which the title rests in the canal company, amounting to about 30,000 acres, which, with the lands belonging to the railroad company, cover nearly all of the ground required for the actual construction of the canal. Some additional land must be acquired for the construction of the lakes at Bohio and Alhajuela and for the outflow from the Gigante Spillway, these additional lands being at present of little value.

Under the law of Colombia dated December 10, 1890, the canal company became entitled to 250,000 hectares (about 625,000 acres) of the land grant provided for in the original Wyse concession. These lands have never been delimited and the company has not actually taken possession of them, but the right to them would pass to the United States. In case the United States should not wish to take and hold these lands, it might relinquish the right in favor of Colombia in the negotiations with that Government for new treaty rights.

2. Buildings. There are scheduled 2,431 buildings, divided among 47 subclassifications, used for offices, quarters, storehouses, hospitals, shops, stables, and miscellaneous purposes. Among them are two large permanent buildings in Panama, one used as the headquarters residence and the other as the general office, large general hospitals at Colon and Panama, and several important buildings at Colon. These buildings are furnished.

3. Plant. There is an immense amount of machinery, consisting of floating plant (tugs, launches, dredges, etc.) and spare parts, with 24 subclassifications; rolling plant (locomotives, cars, etc.) and spare parts, with 17 subclassifications; stationary and semistationary plant (excavators, cranes, pumps, etc.), with 25 subclassifications. The Commission does not attach much value to this plant for the reasons given in its report of November 16, 1901.

There are also many surveying and other instruments, office supplies and stationery, surgical and medical outfit, and miscellaneous supplies covering thousands of items.

4. Work done. The excavation already accomplished upon the main canal line which will be of value in the plan recommended by the Commission was carefully computed and was found to be 36,689,965 cubic yards. As stated in the report of November 16, 1901, the amount of excavation which can be utilized in the Chagres diversion is 210,873 cubic yards and in the Gatun diversion 2,685,494 cubic yards. Adding these together, the total quantity of excavation which will be of value in the new plan is 39,586,332 cubic yards. A temporary diversion of the Panama Railroad has been made

at the Culebra cut which also must be considered. Using the same classification of materials and the same unit prices as in the other estimates, with the 20 per cent added for contingencies, the value of the work done is found to be:

Canal excavation	\$21, 020, 386
Chagres diversion	178, 186
Gatun diversion	1, 396, 456
Railroad diversion (4 miles)	300, 000
	<hr/>
	22, 895, 028
Contingencies, 20 per cent	4, 579, 005
	<hr/>
Aggregate	27, 474, 033

Of the existing 70,000 shares of the Panama Railroad the canal company will transfer to the United States all but about 1,100 shares. These latter are held by a few individuals residing in various parts of the United States and in Europe. As it will not be the policy of the United States to so manage the railroad as to secure a large revenue, it is probable that the holders of these shares will in time find it to their interest to dispose of them at the price fixed by the Commission for the other shares, viz, their par value. At par the value of the 68,863 shares to be transferred to the United States by the canal company is \$6,886,300. .

Against this property are mortgage bonds to the amount of \$3,439,000. Of this amount the company owns \$871,000 which it has pledged as collateral for its debt to the Panama Canal Company described below, and it also holds in its treasury \$1,064,000 subject to sale or cancellation, leaving outstanding in the hands of the public \$1,504,000. The bonds bear 4½ per cent interest.

There are outstanding also \$996,000 6 per cent sinking-fund subsidy bonds, but this liability is an amortization of the annual payment of \$225,000 due the Colombian Government under its concession for the period ending November 1, 1910.

The railroad company owes \$986,918 to the Panama Canal Company, mainly on account of the construction of the pier at La Boca.

Its total liabilities, therefore, are \$2,490,918, not counting the sinking-fund subsidy bonds, for which the Colombian Government has received the benefit and for which it should make allowance to the United States in the negotiations for treaty rights.

Its cash assets January 15, 1902, were \$438,569.33.

It owns three passenger and freight steamers of American registry, the *Alliance*, *Advance*, and *Finance*, of approximately 2,000 tons net each, which, together with a chartered steamer, the *Orizaba*, run between New York and Colon on a weekly schedule. For the past year it has operated a line of chartered steamers of American registry

between San Francisco and Panama. These steamers, owned or chartered, on the Atlantic and Pacific constitute the Panama Railroad Steamship Line.

The railroad company owns an undivided half interest in the islands of Naos, Culebra, Perico, and Flamenco in the Bay of Panama, the Pacific Mail Steamship Company being the joint owner.

Besides its right of way, terminals, wharves, and considerable areas of land, it owns nearly the whole of the town of Colon, the houses there being constructed under leases.

The railroad company has no operating contracts which can not be terminated in ninety days.

The work of constructing the canal will largely increase the business of the railroad, and will enable it to pay off its liabilities in a very few years. After the completion of the canal its commercial profits will probably cease, but it will have a value incidental to operating the canal.

The value of the maps, drawings, and records in Paris, on the Isthmus, or elsewhere, all of which are to be transferred to the United States, as stated in the cablegram of January 11, is placed at \$2,000,000.

Summing up the foregoing items, the total value of the property is found to be:

Excavation done	\$27, 474, 033
Panama Railroad stock at par	6, 886, 300
Maps, drawings, and records	2, 000, 000
	<hr/>
	36, 360, 333
To which add 10 per cent to cover omissions	3, 639, 667
	<hr/>
	40, 000, 000

the last item being intended to cover any buildings, machinery, railroad shares, additional excavation to date of purchase, and other assets which may be of value to the United States and have not been included in the other items.

In reciting its conclusions in the report dated November 16, 1901, this Commission stated that the selection of the most feasible and practicable route must be made between the Nicaragua and Panama locations, adopting a plan of canal with locks in each case. It concluded that the water-supply features were satisfactory on both lines; that both dams, by which the summit levels would be sustained, were practicable, the advantage being in favor of the Conchuda dam at Nicaragua; that the plan of regulating the summit level was practicable in each case, though less simple on the Nicaragua route than on the Panama; that the present means of transportation were inadequate on the Nicaragua route, while a well-equipped railroad was in operation along the entire length of the Panama route; that there are now no natural har-

bors at Nicaragua, while serviceable ones exist at both ends of the Panama route, and although with the completion of the harbors as planned one route would have little advantage over the other, the balance was probably in favor of Panama; that owing to the absence of harbors and railroads the period of preparation at Nicaragua would be twice that at Panama.

It was also the sense of the Commission that the total time required for the construction of the canal by the Panama route would be ten years, and eight years by the Nicaragua route, with a greater probability of exigencies causing delays on the latter than on the former.

The estimated cost of constructing the Nicaragua Canal is \$45,630,704 more than the cost of completing the Panama Canal.

The estimated annual cost of maintenance and operation is \$1,300,000 greater at Nicaragua than at Panama.

The Panama route would be 134.6 miles shorter than the Nicaragua route from sea to sea, with fewer locks and less curvature both in degrees and miles. The estimated time for a deep-draft vessel to pass through the Nicaragua Canal was placed at thirty-three hours, as against twelve hours for Panama, these estimates being the time of actual navigation and not including delays for winds, currents, or darkness.

If the passage were made without interruption, about a day could be saved by the Nicaragua over the Panama route by ordinary steamers handling commerce between our Pacific ports and all Atlantic ports, and about two days by steamers of the same class trading between our Gulf ports and North Pacific ports. The time advantage of the Nicaragua route would be less in the case of fast high-powered steamers, the use of which is increasing. Between Atlantic ports and the west coast of South America the Panama route has the advantage of about two days, and between the Gulf ports and the west coast of South America the Panama route has the advantage of about one day. The trade of the western coast of South America is a very important one, which has hitherto been in European hands.

The Panama route is an old highway of commerce, along which no considerable industrial development is likely to occur. During the construction of a canal on the Nicaragua route business relations would be established with Costa Rica and Nicaragua which would be likely to continue. Existing conditions indicate hygienic advantages at Nicaragua, though equally effective sanitary measures must be taken in both cases.

The offer received from the New Panama Canal Company to convey all its property, including all its interest in the Panama Railroad, to the United States will make the estimated cost of the two canals as follows:

Nicaragua	\$189,864,062
Panama	184,222,358

The transfer would give title to all the land now held by both the Panama Canal Company and the Panama Railroad Company, which covers nearly all lands required for the construction of the canal. The land held by private parties at Nicaragua must be acquired, and its acquisition may prove expensive.

The question whether the New Panama Canal Company can make to a purchaser a valid title to the property formerly belonging to the old company, its predecessor, has been considered and answered in the former reports of the Commission, but in view of its importance in connection with the present offer the results of the investigation made will be again presented.

The old company, in addition to its canal property acquired under its concession from the Colombian Government, owned nearly all of the shares of the Panama Railroad Company. By purchasing these it obtained the control of the concession under which the road had been built. The latter concession will continue in force until 1966; the canal concession is to run for ninety-nine years from the day on which the canal shall be opened to public service, and the date fixed for this in the concession, according to its latest extension, is October 31, 1910. When these periods expire the different properties are to belong absolutely to Colombia, without compensation, and the Government is under no obligation to extend either concession.

The canal company is absolutely prohibited to cede or mortgage its rights, under any consideration whatever, to any nation or foreign government under penalty of forfeiture. The contract with the railroad company contains a like prohibition, and declares further that the pain of forfeiture will be incurred by the mere act of attempting to cede or transfer its privilege to a foreign government, and such an act is declared absolutely null and of no value and effect. But for the purpose of permitting the New Panama Canal Company to enter upon the negotiations which have resulted in the present offer, Colombia has waived these prohibitions and has authorized the company to treat directly with the United States, with a view to the use and occupation of the territory of the former for canal purposes if our Government should select the Panama route for an isthmian canal. After the old company failed a liquidator was appointed by the French court to take charge of its property and affairs. When the new company was formed he was authorized to contribute to it the rights, privileges, plans, documents, plant, and unfinished work in his hands and under his control, and in consideration of this grant he was to receive 60 per cent of the net profits of the enterprise after deducting all expenses, charges, and stipulated dividends to be distributed by him among the parties in interest.

This interest of the old company is still under the protection of the liquidator, and he must be a party to any arrangement that may be

entered into for a sale and conveyance of the property, and as he derives his authority from the tribunal that appointed him, his action requires the approval and confirmation of the court.

The papers before the Commission show that the liquidator has agreed to the proposition and that he is acting under judicial authority.

A deed to the property executed by the canal company and the liquidator requires the approval of the Government of Colombia because of the prohibition already referred to in the concessions and for the further reason that the Republic owns 50,000 shares of 100 francs each of the stock of the company, full paid, of which it can not be deprived without its consent.

Such a transfer of title thus approved would give to the United States the same right, title, and interest in the premises that the New Panama Canal Company now has, but that would not be sufficient. The existing concessions thus purchased would be valuable only because their ownership by the United States would remove the obstacles in the way of negotiations between the two Governments for the occupation of Colombian territory by the United States for canal purposes; but these concessions are unsatisfactory and insufficient, and a new arrangement must be made if an isthmian canal is to be constructed by our Government across the Isthmus of Panama.

The grant must be not for a term of years, but in perpetuity, and a strip of territory from ocean to ocean of sufficient width must be placed under the control of the United States. In this strip the United States must have the right to enforce police regulations, preserve order, protect property rights, and exercise such other powers as are appropriate and necessary. The business relations between the railroad and canal companies and the Colombian Government must also be settled, and the consideration to be paid by the United States for the privileges and rights to be exercised in the future must be agreed upon free from all embarrassment with reference to past transactions.

The Commission has no power to enter upon negotiations for the arrangement of these matters. They belong to the treaty-making power; but the acceptance of the terms offered by the New Panama Canal Company should be conditioned upon their satisfactory adjustment.

The advantages of the two canal routes have been restated according to the findings of the former report. There has been no change in the views of the Commission with reference to any of these conclusions then reached, but the new proposition submitted by the New Panama Canal Company makes a reduction of nearly \$70,000,000 in the cost of a canal across the Isthmus of Panama, according to the estimates contained in the former report, and with this reduction a canal can be there constructed for more than \$5,500,000 less than through Nicara-

gua. The unreasonable sum asked for the property and rights of the New Panama Canal Company when the Commission reached its former conclusion overbalanced the advantages of that route, but now that the estimates by the two routes have been nearly equalized the Commission can form its judgment by weighing the advantages of each and determining which is the more practicable and feasible.

There is, however, one important matter which can not enter into its determination, but which may in the end control the action of the United States. Reference is made to the disposition of the Governments whose territory is necessary for the construction and operation of an isthmian canal. It must be assumed by the Commission that Colombia will exercise the same fairness and liberality if the Panama route is determined upon that have been expected of Nicaragua and Costa Rica should the Nicaragua route be preferred.

After considering the changed conditions that now exist and all the facts and circumstances upon which its present judgment must be based, the Commission is of the opinion that "the most practicable and feasible route" for an isthmian canal, to be "under the control, management, and ownership of the United States," is that known as the Panama route.

We have the honor to be, sir, with great respect, your obedient servants,

J. G. WALKER,
Rear-Admiral, United States Navy, President of Commission.

SAMUEL PASCO.

ALFRED NOBLE.

GEO. S. MORISON.

PETER C. HAINS,

Colonel, United States Corps of Engineers.

WM. H. BURR.

O. H. ERNST,

Lieutenant-Colonel, United States Corps of Engineers.

LEWIS M. HAUPT.

EMORY R. JOHNSON.

57TH CONGRESS, {
1st Session.

SENATE.

{ DOCUMENT 253,
Part 2.

HEARINGS

BEFORE THE

SENATE COMMITTEE ON INTEROCEANIC CANALS

ON

H. R. 3110, FIRST SESSION FIFTY-SEVENTH CONGRESS.
IN THREE PARTS.

MARCH 14, 1902.—Ordered to be printed.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.

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STATEMENT

OF

THOMAS B. ATKINS

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Saturday, March 8, 1902.*

The subcommittee met at 10.30 a. m.

Present: Senators Morgan (chairman), Hanna, and Mitchell.

Also Senator Kittredge, a member of the committee.

Mr. Thomas B. Atkins appeared and was duly sworn by the chairman.

STATEMENT OF MR. THOMAS B. ATKINS.

Senator KITTREDGE. What official position, if any, do you have with the Maritime Canal Company?

Mr. ATKINS. I am one of the directors and the secretary and treasurer of the company.

Senator KITTREDGE. How long have you held that position?

Mr. ATKINS. I have been secretary and treasurer of the company since an early date in May, 1889. I do not recollect the exact date.

Senator KITTREDGE. When was the company organized?

Mr. ATKINS. It was organized early in May, 1889. It was a few days after its organization that I was elected secretary and treasurer of the company.

Senator KITTREDGE. And you have held that position ever since?

Mr. ATKINS. Ever since.

Senator KITTREDGE. And as such officer I suppose you have in your possession all the records of the company?

Mr. ATKINS. I have.

Senator KITTREDGE. All the stock books?

Mr. ATKINS. Yes, sir.

Senator KITTREDGE. The records of the stockholders?

Mr. ATKINS. Yes.

Senator KITTREDGE. The records showing the money received by the company?

Mr. ATKINS. Yes.

Senator KITTREDGE. From what source?

Mr. ATKINS. Yes.

Senator KITTREDGE. To whom paid?

Mr. ATKINS. Yes.

Senator KITTREDGE. All the records showing the issue of bonds?

Mr. ATKINS. Yes.

Senator KITTREDGE. And to whom?

Mr. ATKINS. Yes.

Senator KITTREDGE. And what the company received for them?

Mr. ATKINS. Yes.

Senator KITTREDGE. Has the company any indebtedness in addition to its bonded debt?

Mr. ATKINS. Yes.

Senator KITTREDGE. What is it?

Mr. ATKINS. I think it is stated in the president's last report as follows:

"Seventh. That the liabilities of the company consist of the amounts still due under the concessions granted to the company of the \$1,855,000 of bonds before mentioned, the said bonds being due to the assignees of the Nicaragua Canal Construction Company for work and labor done and materials furnished in the execution of the work of constructing the interoceanic canal, and of cash liabilities outstanding unpaid to an amount not exceeding \$200,000."

That is paragraph 7, on page 3 of the president's report.

Senator KITTREDGE. What is meant and referred to by the term "concessions" in the paragraph you have just read?

Mr. ATKINS. That would be the concessions granted to the company by the State of Nicaragua and by the State of Costa Rica.

Senator KITTREDGE. Are you able to state how much is due the Governments you have mentioned for such concessions?

Mr. ATKINS. According to my recollection there is \$6,000,000 due to Nicaragua and \$1,500,000 to Costa Rica under the terms of the concessions.

The CHAIRMAN. Six per cent?

Mr. ATKINS. Yes. I have the concessions here.

The CHAIRMAN. Due in what way—in money?

Mr. ATKINS. No; in stock of the company.

Under the concessions granted the company by the States of Nicaragua and Costa Rica 6 per cent of the capital stock of the company is due to be paid to Nicaragua and 1½ per cent of the capital stock of the company to be paid to Costa Rica.

Nicaragua has claimed of the company that that demand should be met in bonds. The company has always asserted that it should be met in stock only.

The CHAIRMAN. Paid-up stock?

Mr. ATKINS. Paid-up stock; and has maintained that assertion on the ground that the original wording of the concession provides that it shall be paid in that security which constitutes the autonomy of the company. Is that clearly understood?

The CHAIRMAN. I understand it.

Mr. ATKINS (continuing). Namely, in the stock, and not in the bonds, while Nicaragua has claimed that it should be paid in bonds, and this has been one of the occasions of difference between the company and the Government of Nicaragua, and it has never been finally settled.

Costa Rica has never made any claim of any kind whatever in the premises, and has appeared to be entirely content with the company's interpretation of the contract.

The wording of the concession concerning this matter is: .

"In consideration of the valuable privileges, franchises, and concessions granted to the company by this contract, the Republic shall receive, in shares, bonds, certificates, or other securities which the company may issue to raise the corporate capital, 6 per centum of the total amount of the issue."

The words "corporate capital," in the mind of the company, signify capital stock only, and their originals in the Spanish are "capital sociale," which, in the same mind, can have no other interpretation than "capital stock," meaning as it does the capital of association.

Senator KITTREDGE. What is the total amount of stock issued by your company?

Mr. ATKINS. That is also stated in the president's report; according to the stockholders' list 222,135 shares have been issued.

The stockholders' list referred to is as follows:

Shareholders of the Maritime Canal Company of Nicaragua, April 12, 1901.

Agar, John G	31 Nassau street, New York.
Ammen, Daniel	Ammendale, Md.
Ambler, John P	Poughkeepsie, N. Y.
Anderson, Wm. P	Cincinnati, Ohio.
Ames, Fredk. L	Boston, Mass.
Ames, Oliver	Boston, Mass.
Andrews, W. C	New York City.
Atkins, Thos. B	New York City.
Aldrich, W. A	San Francisco, Cal.
Atkins, trustee, Thos. B	New York City.
Aldige, administrators, Jules and Georges ..	New Orleans, La.
Armour, H. O	New York City.
Ashby, A. M	San Francisco, Cal.
Anness, F. W	New York City.
Augus, James S., and others	Ex. New York City.
Ahern, Henry E	New York City.
Bainbridge, Elmer E	
Bradford, Gamailiel	Boston, Mass.
Blackstone, T. B	Chicago, Ill.
Barker, John	New York City.
Bacharach, D	New York City.
Baker, L. L	San Francisco, Cal.
Baker, G. S	Chicago, Ill.
Barroll, B. C., jr	New York City.
Bates, Henry H	Washington, D. C.
Bennett, F. W	Cape May, N. J.
Bevier, P. H	Brooklyn, N. Y.
Bannard, Otto T	New York City.
Bergstresser, Chas. M	New York City.
Beal, Leander	Boston, Mass.
Beltrimini, J	New York City.
Bernheimer, Marcus	St. Louis, Mo.
Beale, Truxton	Washington, D. C.
Bell, Henry	Hampstead, N. W., England.
Bird, P. H	New York City.
Bigelow, S. C	San Francisco, Cal.
Billings, Estate of Fredk	New York City.
Bliss, Cornelius N	New York City.
Brownson, Isabelle K	Yonkers, N. Y.
Brownson, W. H	Yonkers, N. Y.
Brown, Samuel N	Boston, Mass.
Bowe, Nathaniel W	Richmond, Va.
Bosher, Robert S	Richmond, Va.
Brodhead, Wm	New Bedford, Mass.
Brokaw, De Witt	New York City.
Bode, Wm. A	Orange Savings Bank, Orange, N. J.
Borden, M. C. D	New York City.
Booth, Thos	St. Louis, Mo.
Bloodgood, Julia C	New York City.
Brooks, Mrs. E. F	St. Johnsbury, Vt.
Burleigh, H. G	Whitehall, N. Y.
Bush-Brown, H. K	Newburgh, N. Y.
Bucknall, Hy. W. J	New York City.
Bryan, Joseph	Richmond, Va.
Bartlett, John R	New York City.
Chamberlaine, Mrs. L. de T	Cheapsides, London, England.
Crane, E. J	New York City.
Cragin, Edward F	New York City.
Crane, R. F	Chicago, Ill

Shareholders of the Maritime Canal Company of Nicaragua, April 12, 1901—Cont'd.

Cheney, Alfred C	New York City.
Crowninshield, A. S.	Washington, D. C.
Crosby, Pierce	Washington, D. C.
Cox, Joseph E.	Richmond, Va.
Cooper, E. M.	San Francisco, Cal.
Crocker, Henry J.	San Francisco, Cal.
Crocker, H. S.	San Francisco, Cal.
Cutting, Robert L.	New York City.
Culver, Helen.	Chicago, Ill.
Chisholm, Stewart.	New York City.
Daly, Chas. P.	New York City.
Darling, Alfred B.	New York City.
Dagron, James G.	Baltimore, Md.
Davis, Horace	San Francisco, Cal.
Daly, Hoyt & Mason.	New York City.
Devries, Christian	Baltimore, Md.
Dorr, Joseph.	Cambridge, Mass.
Downing, Wellington	Erie, Pa.
Doyle, John T.	San Francisco, Cal.
Donohue, Joseph A.	New York City.
Dodge, Sweeny & Co.	San Francisco, Cal.
Doe, Charles T.	San Francisco, Cal.
Doe, John S.	San Francisco, Cal.
Donaldson, W. R.	St. Louis, Mo.
Dodge, G. M.	New York City.
Dorr, Ellerton D., and W. O. Gay	Ad. Boston, Mass.
Duckworth, Joseph B.	Savannah, Ga.
Dunn, John.	Chicago, Ill.
Dutard, H.	San Francisco, Cal.
Dunham, B. F.	New York City.
Durbrow, Eldridge (trustee)	San Francisco, Cal.
Ehrmann & Co., M.	San Francisco, Cal.
Edwards, R. L.	New York City.
Estee, Morris M.	San Francisco, Cal.
Eastman, Lucy P.	Tarrytown, N. Y.
Eastman, Joseph.	Tarrytown, N. Y.
Einstein, Henry L.	Bound Brook, N. J.
Edison, Thomas A.	New York City.
Eyre, E. E.	San Francisco, Cal.
Emery, John J.	New York City.
Franklin, Samuel R.	Washington, D. C.
Fairbank, N. K.	Chicago, Ill.
Fair, James G.	San Francisco, Cal.
Franks, R. A., trustee.	Pittsburg, Pa.
Flagler, H. M.	New York City.
Francis, David R.	St. Louis, Mo.
Fairbanks, Mrs. Mary E.	St. Johnsbury, Vt.
French, M. E.	Chicago, Ill.
Fleitman, E.	New York City.
Feldstein, Mrs. A. C.	New York City.
Fensier, Louis.	San Francisco, Cal.
Fish, Stuyvestant.	New York City.
Frost, Rufus S.	Boston, Mass.
Foster, S.	San Francisco, Cal.
Forbes, John M.	Boston, Mass.
Furlong, Philip.	New York City.
Glavis, George O.	Washington, D. C.
Grant, Hugh J.	New York City.
Glatz, K. A.	Brooklyn, N. Y.
Graham, B. B.	St. Louis, Mo.
Gay, William O.	Boston, Mass.
Gelshenen, W. H.	New York City.
Gerber, John.	New York City.
Greeley, C. S.	St. Louis, Mo.
Gerberding, Albert.	San Francisco, Cal.
Ghiradelli & Son, D.	San Francisco, Cal.
Goodwin, C. R.	Baltimore, Md.
Gordon, Basil B.	Baltimore, Md.

Shareholders of the Maritime Canal Company of Nicaragua, April 12, 1901—Cont'd.

Glover, Charles C.....	Washington, D. C.
Gordon, Nannie C	14 E. Franklin st., Baltimore, Md.
Grow, C. A.....	San Francisco, Cal.
Guzman, H.....	
Guilbert, Edward	New York City.
Gudewill, George.....	New York City.
Gudewill, Mrs. H.....	New York City.
Grosvenor, J. D. M.....	New York City.
Harder, Francis C.....	Plainfield, N. J.
Harrison Charles K.....	Pikesville, Md.
Hayward, Alvinza.....	San Francisco, Cal.
Hayden, Brace	New York City.
Hentz, Henry	New York City.
Herbert, Wilbur F.....	New York City.
Henderson, D. M	New York City.
Herrick, Mrs. Mary F.....	Springfield, Mass.
Hitchcock, Hiram	New York City.
Hills, Thomas O	Washington, D. C.
Hill, Mary C	New York City.
Hoyt, Henry R.....	New York City.
Hotchkiss, Horace L	New York City.
Hotchkiss, Mary L	Plainfield, N. J.
Hopewell, John, jr.....	Boston, Mass.
Howland, Henry E	New York City.
Howland, Henry E., ex.....	New York City.
Honegger, Theo	New York City.
Honegger, Theo., trustee	New York City.
Holbrook, Merrill & Stetson.....	New York City.
Holbrook, Edward.....	New York City.
Houser, D. M	St. Louis, Mo.
Hutchinson, Geo.....	Boston, Mass.
Hughes, Wm. E.....	St. Louis, Mo.
Hoyt, Alfred M	New York City.
Howard, Robert R	New York City.
Iselin & Co., A.....	New York City.
James, Darwin R.....	New York City.
Jeffress, Thos.....	Richmond, Va.
Joost, Behrend	San Francisco, Cal.
Joost, Fabian.....	San Francisco, Cal.
Johnson, J. C	San Francisco, Cal.
Kaime, Geo. J., and others, trustees	St. Louis, Mo.
Keasbey, A. Q	Newark, N. J.
Kellogg, L. Laflin	New York City.
Keasbey, Eugene	Newark, N. J.
Kelly, Edward.....	New York City.
Keith, O. P.....	Rahway, N. J.
Kissell, Gustav E	New York City.
Kirkland, C. P.....	New York City.
Kingsley, Mrs. J. T	New Haven, Conn.
Kilner, S. E	New York City.
Koch, J. Otto	New York City.
Keasbey, Edward Q.....	Newark, N. J.
Lancaster, R. A.....	New York City.
Lamb, Geo.....	Boston, Mass.
Langley & Michaels Co	San Francisco, Cal.
Lancaster, E. R.....	New York City.
Lay, Chas. C.....	Chicago, Ill.
Ledyard, L. C	New York City.
Levi & Co., H	San Francisco, Cal.
Leary, Mary C	New York City.
Leary, James D	New York City.
Leighton, Geo. E	St. Louis, Mo.
Leigh, C. J.....	New York City.
Liebes & Co., H	San Francisco, Cal.
Livingstone & Co.....	San Francisco, Cal.
Lozier, Sarah J	New Brighton, Staten Island.
Mason, Alex. T	New York City.
MacDonald, Joseph E.....	Indianapolis, Ind.

Shareholders of the Maritime Canal Company of Nicaragua, April 12, 1901—Cont'd

McGuire, Fredk. B	Washington, D. C.
MacDonough, Wm. O'B	New York City.
McMullan, James H	Biddeford, Me.
Mailler, Wm. H	New York City.
McGuire, F. H	Richmond, Va.
Macaulay, John L	New York City.
Mason, Wallace L	Keene, N. H.
Mackey, Wm. H	Mount Vernon, N. Y.
Magerhans, A. W	New York City.
McLean, C. B	Pittsburg, Pa.
Mackey, Wm. H., trustee	Mount Vernon, N. Y.
McCormick, Cyrus H	Chicago, Ill.
Macdonough, Wm. O'Brien	New York City.
Mackey, John W	San Francisco, Cal.
McKittrick, Hugh	St. Louis, Mo.
McLure, Chas. D	St. Louis, Mo.
Maffitt, Chas. C	St. Louis, Mo.
Macdonough, Jos. M	San Francisco, Cal.
MacDonald, Chas	New York City.
Menocal, A. G	New York City.
Merry, Wm. L	San Francisco, Cal.
Merry, Wm. L., trustee	San Francisco, Cal.
Miller, J. W	New York City.
Miller, Hoffman	New York City.
Miller, Warner	New York City.
Miller, Elizabeth B	Elizabeth, N. J.
Miller, S. C	Whiteplains, N. Y.
Miller, S. C., treasurer	Whiteplains, N. Y.
Miller, Albert	San Francisco, Cal.
Miller & Lux	San Francisco, Cal.
Moss, H. O	New Berlin, N. Y.
Montague, J. J	Richmond, Va.
Morse, Chas. H	Chicago, Ill.
Morris, John T	Philadelphia, Pa.
Morris, Jas. E	New York City.
Moller, P. E	New York City.
Mootry, Thos	San Francisco, Cal.
Munoz, Jose M	New York City.
Murphy, Grant & Co	San Francisco, Cal.
Muser, Richard	New York City.
Muller, Emile	New Orleans, La.
Muller, Fredk.	New York City.
Muller, Carl	New York City.
Munoz & Espriella	New York City.
Monteagle, Louis F	San Francisco, Cal.
Menocal, Edward	New York City.
Naber, Alfs & Brune	San Francisco, Cal.
Newcombe, Richard S	New York City.
Nelson, L. C	St. Louis, Mo.
Nelson, Mary A	Denver, Colo.
Nicaragua, Republic of	
Nichols, Alice	Washington, D. C.
Noyo Lumber Co	San Francisco, Cal.
O'Shaughnessy, J. F	New York City.
Otz, Ernest	New York City.
Orthwein, Chas. F	New York City.
O'Connor, T. H	St. Louis, Mo.
Parr, Henry A	Baltimore, Md.
Parrott, Abbie M	San Francisco, Cal.
Plankinton, Elizabeth A	Milwaukee, Wis.
Parsons, Chas	St. Louis, Mo.
Pacific Lumber Co	San Francisco, Cal.
Pleasants, James	Richmond, Va.
Peaslee, Edward H	New York City.
Pellas, Francisco A	New York City.
Phelan, James J	New York City.
Perry, Mrs. L. T	Brooklyn, N. Y.
Phipps, Henry, jr	Pittsburg, Pa.

Shareholders of the Maritime Canal Company of Nicaragua, April 12, 1901—Cont'd.

Potts, Thomas	Richmond, Va.
Poillon, Richard	New York City.
Pollock, Alex.	New York City.
Porter, Geo. K.	San Francisco, Cal.
Pope & Talbot	San Francisco, Cal.
Porter, Horace	New York City.
Potter, Orlando B	New York City.
Pullman, Geo. M.	Chicago, Ill.
Putzel, Henry	New York City.
Pierce, Henry D	Indianapolis, Ind.
Queen, Walter W.	Washington, D. C.
Randolph, Norman V	Richmond, Va.
Rathbone, J. L.	San Francisco, Cal.
Isaac Rich, Sarah E. Hussey, and Henry Rich.	Somerville, Mass.
Richardson, Mary G.	New York City.
Roosevelt, James	Hyde Park, New York.
Robinson, Geo. H.	New York City.
Rowland, William	New York City.
Roethlisberger & Gerber	New York City.
De Ruyter, John	New York City.
Sandford, Thos. S.	New York City.
Sandford, Mary L.	New York City.
Starbuck, Wm. H.	New York City.
Schall, Wm., jr.	New York City.
Stratton, Hattie L.	New York City.
Stapfer, J. J.	New York City.
Slaven, H. B.	New York City.
Schwartz, M.	Poughkeepsie, N. Y.
Shannon, Richard C.	New York City.
Stebbins, Chas. H.	New York City.
Sweet, Jos. L.	Attleboro, Mass.
Seddon, Wm. C.	Baltimore, Md.
Shepard, Augustus D.	New York City.
Skey, G. W.	Woodbridge, Cal.
Stevens, Catherine A.	New York City.
Stevens, C. Amory	New York City.
Steele & Condit	Jersey City, N. J.
Strenli, C. F.	New York City.
Sheldon, Mark	San Francisco, Cal.
Spreckles & Bros., J. D.	San Francisco, Cal.
Shedd, Edward A.	Chicago, Ill.
Shedd, Chas. B.	Chicago, Ill.
Steinhart, Wm.	San Francisco, Cal.
Spencer, Emily M. R.	New York City.
Scriven, Geo. P.	Atlanta, Ga.
Smith, Edmund H.	Albany, N. Y.
Smith, Marcellas	Richmond, Va.
Schmidt, Chas. F.	New York City.
Smith, Theo.	Jersey City, N. J.
Spring, J. R.	San Francisco, Cal.
Schmiedel, Henry	San Francisco, Cal.
Simmons, E. C.	St. Louis, Mo.
Smith, Thos. E.	Brooklyn, N. Y.
Sloss & Co., Louis	San Francisco, Cal.
Soper, Arthur W.	New York City.
Sturgis, Robert	New York City.
Studebaker Bros. Mfg. Co.	South Bend, Ind.
Simpson, John B.	New York City.
Tag, Casimir	New York City.
Taylor, Henry C.	Washington, D. C.
Taylor, Virginia N.	Washington, D. C.
Taylor, D. M.	Angusta Arsenal, Ga.
Taylor, Robert E.	Poughkeepsie, N. Y.
Taussig, Edward D.	Washington, D. C.
Taylor, C. L.	San Francisco, Cal.
Taussig, William	St. Louis, Mo.
Treat, Chas. P.	Chicago, Ill.
Tedcastle, Chas. B.	New York City.

Shareholders of the Maritime Canal Company of Nicaragua, April 12, 1901—Cont'd.

The Nicaragua Company.....	New York City.
Tichenor, A. R.....	Washington, D. C.
Tisdale, Wm. D.....	San Jose, Cal.
Thompson, F. F.....	New York City.
Thomas, Saml.....	New York City.
Thurston, James S.....	New York City.
Unckles, Thos. H.....	New York City.
Ubsdell, John A.....	Port Eads, La.
Van Winkle, Isabella.....	San Francisco, Cal.
Viotor, Adolph.....	New York City.
Ward, Mrs. Lawrence.....	Oswego, N. Y.
Walker, W. F.....	New Britain, Conn.
Weed, Smith M.....	New York City.
Wendt, Bernard.....	New York City.
Wettlaufer, F. W.....	New York City.
West, George.....	Ballston Spa, N. Y.
Williams, jr., Thos. C.....	Richmond, Va.
Williams, jr., executor, Thos. C.....	Richmond, Va.
Whitaker, Joseph K.....	New York City.
Williams, Jeremiah.....	New York City.
Whittier, Fuller & Co.....	San Francisco, Cal.
Wintringham, trustee, T.....	San Francisco, Cal.
Williams & Son, Jno. L.....	Richmond, Va.
Williams, Henry.....	San Francisco, Cal.
Winter, E. J.....	New York City.
Wolfe, Joel B.....	New York City.
Weil, George.....	
Ziegen, Henrietta.....	New York City.

Senator KITTREDGE. What is the par value of the stock?

Mr. ATKINS. One hundred dollars a share.

Senator KITTREDGE. What does the company receive in consideration of the issue of this stock?

Mr. ATKINS. I am afraid I should have to refer to the books of the company to give you an exact answer. In matters of detail, of course, I can hardly depend upon my memory. I can give you a general answer, if that will be sufficient. May I answer it with that qualification?

Senator KITTREDGE. Yes.

Mr. ATKINS. One hundred and twenty thousand shares were issued by the company for the purchase of the concessions.

The CHAIRMAN. From whom?

Mr. ATKINS. They were bought from the Nicaragua Canal Construction Company. Sixty thousand shares were issued for delivery to Nicaragua, but have not yet been delivered. They are still in possession of the company.

The CHAIRMAN. Was that in payment of the 6 per cent?

Mr. ATKINS. In payment of the 6 per cent; issued for the purpose of paying the 6 per cent.

The CHAIRMAN. Mentioned in the concession?

Mr. ATKINS. Yes; they were tendered to the Government of Nicaragua, but not received, and are still in possession of the company.

Ten thousand one hundred and forty-five shares were issued for cash subscriptions, money paid into the company. Thirty-one thousand nine hundred and ninety shares were issued to the construction company for work done under the contract.

Senator KITTREDGE. What is the amount of stock issued and delivered to the construction company?

Mr. ATKINS. Thirty-one thousand nine hundred and ninety shares.

Senator KITTREDGE. What was the consideration of the issue of this stock to the construction company?

Mr. ATKINS. Work done by the construction company in performance of its contract.

Senator KITTREDGE. What amount in dollars did your company receive?

Mr. ATKINS. For that stock?

Senator KITTREDGE. Yes.

Mr. ATKINS. It received nothing in dollars. It received work.

Senator KITTREDGE. What did it represent in dollars?

Mr. ATKINS. It represented in dollars \$3,199,000.

Senator KITTREDGE. What was the amount of bonds, if any, that your company issued and delivered to the construction company?

Mr. ATKINS. We delivered \$5,000,000 of bonds and an obligation for \$1,855,000 of bonds.

Senator KITTREDGE. In what shape was that obligation?

Mr. ATKINS. My impression is that it is a written copy of the bond itself.

Senator KITTREDGE. Why was it issued in that form?

Mr. ATKINS. Because the construction company was not prepared to instruct us as to the form in which they wished the bonds delivered.

Senator KITTREDGE. Is it not a fact that your company has issued to the construction company stock representing a face value of something over \$16,000,000?

Mr. ATKINS. No, sir.

Senator KITTREDGE. And bonds representing a face value of something over \$6,000,000?

Mr. ATKINS. Yes.

Senator KITTREDGE. That is true?

Mr. ATKINS. That is true of the bonds, but not of the stock.

Senator KITTREDGE. Do you know where this stock and where the bonds are at the present time, who owns them or holds them?

Mr. ATKINS. My impression is that the large majority of the bonds and of the stock is owned by the construction company.

Senator KITTREDGE. Do you mean the old construction company or the reorganized construction company?

Mr. ATKINS. The reorganized company. They bought it in buying the assets of the old company.

Senator KITTREDGE. Do you know whether the reorganized company secured all the stock and all the bonds that your company had issued to it?

Mr. ATKINS. All of it. The reorganized company acquired all the stock and bonds that remained at that time in possession of the old company. Twelve million dollars of stock was issued to the construction company for the purchase of the concessions, as I have already stated.

Senator HANNA. To the old company?

Mr. ATKINS. To the old company.

Senator HANNA. Concessions from whom?

Mr. ATKINS. From Nicaragua and Costa Rica. Those concessions were originally issued to an association.

Senator KITTREDGE. With which Mr. Menocal was connected?

Mr. ATKINS. With which Mr. Menocal was connected as attorney in fact. The attorney in fact for the association obtained the concessions. Those concessions were finally conveyed to the construction company. The construction company received those concessions from Mr. Menocal and his associates, who did the preliminary work, and the construction company sold them, under the provision of the concessions, to the Maritime Canal Company for that \$12,000,000 stock. That, so far as my memory goes now, was the correct sequence of events.

Senator HANNA. Was Mr. Menocal acting as attorney for the association?

Mr. ATKINS. Yes.

Senator HANNA. Was he a member of the association?

Mr. ATKINS. I think I have a record here that will tell you. No; his name does not appear as one of the association.

Senator HANNA. Was he ever an officer of the association?

Mr. ATKINS. In no other way than as attorney.

The CHAIRMAN. You mean attorney in fact—not a lawyer?

Mr. ATKINS. Attorney in fact. He was not a lawyer.

Senator HANNA. I understood that.

Senator KITTREDGE. What became of the balance of the stock and bonds?

Mr. ATKINS. That is a question that can only be answered by the reorganized company itself, and by reference to its records.

Senator KITTREDGE. Will your books or your records show where the stock and bonds are at the present time and by whom held?

Mr. ATKINS. They do not; they only show the delivery of them to the parties with whom we were related in business. What became of them afterwards does not appear on our books.

The CHAIRMAN. You refer to stock in the Maritime Canal Company delivered to the construction company?

Mr. ATKINS. Yes.

Senator KITTREDGE. Were any of the officers and directors or stockholders of the Maritime Canal Company connected with the construction company, either the old one or the reorganized company?

Mr. ATKINS. I think they were.

Senator KITTREDGE. To what extent?

Mr. ATKINS. That I can not tell. That would appear by the construction company's record of stockholders.

Senator KITTREDGE. What amount, then, in stock and bonds, has the company paid for concessions from Nicaragua and Costa Rica?

Mr. ATKINS. We paid \$12,000,000, 120,000 shares of stock, for purchase of the concessions obtained, and we issued \$6,000,000, or 60,000 shares of stock for delivery to Nicaragua, but that sum has not yet been delivered.

Senator KITTREDGE. And a million and a half to Costa Rica?

Mr. ATKINS. That has never been issued nor asked for.

Senator KITTREDGE. Is there anything due Costa Rica?

Mr. ATKINS. Oh, yes.

Senator KITTREDGE. How much?

Mr. ATKINS. One million and a half of dollars of stock.

Senator KITTREDGE. And all this stock was at par value?

Mr. ATKINS. Of par value; yes, sir.

Senator KITTREDGE. And to be fully paid up?

Mr. ATKINS. Yes.

Senator KITTREDGE. According to your theory of the controversy?

Mr. ATKINS. It was fully paid up on the books of the Maritime Canal Company.

Senator KITTREDGE. How much in bonds, if any, have been issued on account of concessions or franchises from the Governments of Costa Rica or Nicaragua?

Mr. ATKINS. Nothing, to my recollection.

Senator KITTREDGE. Now, what does the company claim to have secured in the nature of concessions?

Mr. ATKINS. Well, sir, the concessions granted by Nicaragua and Costa Rica are both of record before the Senate of the United States. They speak for themselves.

Senator KITTREDGE. What do you claim for them?

Mr. ATKINS. We claim for them the right to build the canal across the country from ocean to ocean.

Senator KITTREDGE. Do you claim to have an exclusive franchise or concession?

Mr. ATKINS. Until it is properly abrogated, yes.

Senator KITTREDGE. What do you claim in regard to the abrogation or forfeiture of the concession or franchise by the Governments we have mentioned?

Mr. ATKINS. That any such forfeiture, if it takes place, must take place under the provisions of the concessions themselves, and that there has been as yet no such forfeiture. That claim is asserted and explained in our protests filed with the United States Government.

Senator KITTREDGE. And you still assert that claim?

Mr. ATKINS. Most certainly.

The CHAIRMAN. A copy of that protest was put in the record yesterday in the testimony of Captain Miller.

Mr. ATKINS. We have filed three protests.

The CHAIRMAN. I put the last one in. That succeeds all the others and sums them up.

Mr. ATKINS. And there is also a further protest in the president's report. The president of the company, in his report of December 5, 1901, makes a further protest in addition to the three already filed, and this is found beginning on page 4 of Senate document No. 27, Fifty-seventh Congress, first session. The matter referred to is as follows:

"In order that the position of this company may at this time be fully understood in relation to the grave and international questions that have arisen, in which are involved the rights and property of hundreds of honorable and patriotic citizens of the United States, there is again annexed to this report the protest of the company to the Department of State, submitted December 2, 1898, marked 'Exhibit A;' also the further protest of September 8, 1899, marked 'Exhibit B,' and the protest of October 23, 1900, marked 'Exhibit C.' Attention is respectfully called to each of these protests, which are hereby renewed and in all respects confirmed.

"The Nicaraguan Government has unlawfully seized and confiscated the entire plant and property of the company in Nicaragua, but, as already stated, such seizure and confiscation were wholly illegal and were forced measures, which this company had no power to resist or control, and they could not and did not legally divest the Maritime Canal Company of Nicaragua of its exclusive and vested rights of property in and to its canal route, lands, rights of way, and other property in the Republic of Nicaragua.

"By said illegal seizure and confiscation the company has been deprived of the lawful possession and enjoyment of its plant and property and has been prevented from prosecuting the work of construction, but the Maritime Canal Company of Nicaragua has never surrendered or abandoned any of its plant or property or its exclusive rights and privileges to construct a ship canal across the territory of Nicaragua, and the ownership of said property, rights, and privileges is still vested in the company.

"A gross and violent act of injustice therefore will be done to citizens of the United States if the Government of Nicaragua is permitted to ignore and disregard the vested rights of this company or to repudiate the same. The Maritime Canal Company of Nicaragua does not expect the United States to determine the questions at issue between the com-

pany and the Republic of Nicaragua, but what it does ask is that the United States Government shall require that the Government of Nicaragua shall act in good faith toward the Maritime Canal Company of Nicaragua, and that it shall not arbitrarily and unlawfully divest the corporation of rights and property justly acquired and solemnly guaranteed, and that all existing differences shall be settled and determined in the manner prescribed in the Cardenas-Menocal concession.

"No declaration of forfeiture of said concession can possess any binding force unless pronounced in conformity with the provisions of said contract. There is no mode under the Cardenas-Menocal concession of settling differences arising between the Government and the company except by arbitration in the manner provided for in article 55 of said concession, and such arbitration having been refused to the company by Nicaragua, any decrees of forfeiture made or attempted to be made by Nicaragua are absolutely void and of no effect, and the vested rights of the Maritime Canal Company of Nicaragua still survive unimpaired in favor of this corporation.

"In closing this report the company desires to record the profound sorrow experienced by the directors and stockholders at the death of Hiram Hitchcock, which occurred on the 30th of December, 1900. Mr. Hitchcock was president of the company from the time of its organization up to the date of his death, and the valuable and important services he rendered during that period in advocating and promoting the construction of the Nicaragua Canal entitle him to the grateful remembrance of the American people.

"In witness whereof the Maritime Canal Company of Nicaragua has caused its corporate seal to be hereunto affixed and these presents to be signed by its president and secretary this 30th day of March, A. D. 1901.

"THE MARITIME CANAL COMPANY OF NICARAGUA,
"By HENRY E. HOWLAND, *President*.

"THOS. B. ATKINS, *Secretary*.

"Hon. E. A. HITCHCOCK,
" *Secretary of the Interior*.

STATE OF NEW YORK,
County of New York, ss:

Henry E. Howland, being duly sworn, says that he is the president of the said The Maritime Canal Company of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

HENRY E. HOWLAND.

Sworn to before me this 30th day of November, 1901.

LUCIUS A. WILSON,
Notary Public, County of New York.

STATE OF NEW YORK,
County of New York, ss:

Thomas B. Atkins, being duly sworn, says that he is the secretary of the said The Maritime Canal Company of Nicaragua; that he has read the foregoing annual report and knows the contents thereof, and that the same is in all respects correct and true.

THOS. B. ATKINS.

Sworn to before me this 30th day of November, 1901.

[SEAL.]

FRANK MAHTCH.
Notary Public.

STATE OF NEW YORK,
County of New York, ss:

On the 30th day of November, in the year 1901, before me personally came Thomas B. Atkins, known to me to be the secretary of the Maritime Canal Company of Nicaragua, and with whom I am personally acquainted, who, being by me duly sworn, did depose and say that he resided in Roselle, N. J.; that he was the secretary of the Maritime Canal Company of Nicaragua; that he knew the corporate seal of said company; that the seal affixed to the foregoing report was such corporate seal; that it was so affixed by the order of the board of directors of said company, and that he signed his name thereto by the like order as secretary of the said company.

And the said Thomas B. Atkins further said that he was acquainted with Henry E. Howland and knew him to be the president of said company; that the signature of the said Henry E. Howland subscribed to the said instrument was in the genuine handwriting of the said Henry E. Howland, and was thereto subscribed by the like order of the said board of directors, and in the presence of him, the said Thomas B. Atkins.

In witness whereof I have hereunto set my hand and official seal this 30th day of November, 1901.

[SEAL.]

FRANK MAHTCH,
Notary Public.

EXHIBIT A.

THE MARITIME CANAL COMPANY OF NICARAGUA,
New York, December 2, 1898.

Hon. JOHN HAY, *Secretary of State.*

SIR: The Maritime Canal Company of Nicaragua, chartered by act of Congress approved February 20, 1889, and the owner of the concession for the construction of an interoceanic ship canal granted by the Republic of Nicaragua on April 24, 1887, known as the Cardenas-Menocal concession, and also of the concession granted by the Republic of Costa Rica, both of which concessions are still outstanding and in full force and effect, hereby presents to the Government of the United States its protest against the recent action of the Republic of Nicaragua in attempting to grant to W. D. Eyre and E. F. Cragin, on the 30th day of October, 1898, a concession for the construction of a maritime ship canal across the territory of said Republic. The company protests on the following grounds:

First. The said action of the Republic of Nicaragua is in direct violation of Article V of the said Cardenas-Menocal concession, whereby the Republic of Nicaragua binds itself not to make any subsequent concession for the opening of a canal between the two oceans during the term of the said Cardenas-Menocal concession, ratified April 24, 1887. Said concession is still in full force and effect, as is admitted by Nicaragua.

Second. The said Cardenas-Menocal concession grants to the Maritime Canal Company of Nicaragua the *exclusive privilege* to excavate and operate a maritime canal across the territory of the Republic of Nicaragua between the Atlantic and Pacific oceans, and provides that the duration of such privilege shall be for ninety-nine years, to be counted from the day the canal shall be opened to universal traffic

(articles 1, 4, 7, and 10). This exclusive privilege will not expire ipso facto at the expiration of the ten-year period granted by article 48, but will continue in full force until the end of the said term of ninety-nine years, or until a forfeiture thereof has been lawfully declared under the provisions of article 53. No such forfeiture can, in any event, be declared under article 46 until after the expiration of the ten-year period therein referred to, and consequently the action of the Republic of Nicaragua in declaring in the Eyre-Cragin agreement that the Cardenas-Menocal concession will expire on the 10th day of October, 1899, is in violation of the terms of said concession and an unlawful attempt to deprive the company of its rights.

Third. The said action of the Republic of Nicaragua is also in direct violation of article 48 of the said Cardenas Menocal concession, which grants a term of ten years to the company for the construction, completion, and opening of the canal for maritime navigation, and provides that if at the expiration of the ten years aforesaid the work shall not be completed so as to have the maritime communication between the two oceans opened, in consideration of the great capital the company may have invested in the enterprise, and of the good will and ability it may have shown, and the difficulties encountered, the Republic binds itself to concede a new extension.

Fourth. The Maritime Canal Company having fully complied with all the provisions of articles 8, 46, 47, and 49 of the Cardenas-Menocal concession, and having invested several millions of capital in the enterprise, an absolute obligation is imposed upon the Republic of Nicaragua, under article 48, to extend the period of ten years for the completion of the canal. This right of extension is not left to the discretion of Nicaragua, but is expressly given to the company by the terms of the concession. The action of Nicaragua in passing the Eyre-Cragin contract is, therefore, an attempt to arbitrarily deprive the company of the extension to which it is lawfully entitled.

Fifth. The Republic of Nicaragua, in making the aforesaid agreement with Messrs. Eyre and Cragin, has been guilty of a breach of its obligations toward the Maritime Canal Company under the Cardenas-Menocal concession, and by repudiating said obligations is attempting wrongfully to deprive the company of its property and exclusive privileges, and if permitted so to do will inflict great loss and irreparable injury upon the bondholders and stockholders of said corporation.

The facts herein stated and grounds of protest herein presented are only a part of the wrongs done to the Maritime Canal Company in connection with the construction of the canal under its concession. Other very serious wrongs have been done to said company by the Government of Nicaragua, which in due season will be stated and laid before the Government of the United States.

The grounds stated in this protest directly concern the United States as well as the Maritime Canal Company of Nicaragua.

The Maritime Canal Company of Nicaragua therefore prays the assistance and interposition of the Government of the United States in the protection of its property and exclusive rights against the aforesaid arbitrary and unlawful acts of the Republic of Nicaragua.

Respectfully,

THE MARITIME CANAL COMPANY OF NICARAGUA,
By HIRAM HITCHCOCK,
President.

EXHIBIT B.

THE MARITIME CANAL COMPANY OF NICARAGUA,
New York, September 8, 1899.

Hon. JOHN HAY, *Secretary of State.*

SIR: The Maritime Canal Company of Nicaragua, chartered by act of Congress approved February 20, 1889, and owner of the exclusive privilege granted by the Republic of Nicaragua to A. G. Menocal on April 24, 1887, to excavate and operate a maritime canal across the territory of said Republic between the Atlantic and Pacific oceans, hereby renews and in all respects confirms the protest dated December 2, 1898, heretofore filed by the company in the State Department against the action of the Government of Nicaragua in granting to Messrs. Edward Eyre and Edward F. Cragin on the 30th day of October, 1898, a concession purporting to be a grant in perpetuity of the exclusive right to construct an interoceanic ship canal through the territory of said Republic, and in attempting to declare that the said Menocal concession will expire on the 9th day of October, 1899. In amplification of said protest the Maritime Canal Company desires to present and lay before the Government of the United States the following supplemental, and more detailed statement of the wrongs done to the said company by the Republic of Nicaragua and of the grounds for protesting against the same:

First. The people and the Government of the United States are deeply interested in the Nicaragua Canal as a necessary means of postal, commercial, military, and naval communication between our coasts, and as an indispensable highway for purposes of national protection and defense.

Acting on these great national necessities, Congress and the Executive Department of the Government have declared, in laws, resolutions, treaties, and diplomatic announcements, that the United States demand and will provide for opening a ship canal through the Nicaragua lakes and the San Juan River as a canal to be under the control of the United States, so that such a canal, to be so controlled, is a distinct feature in the public policy of the United States.

Nicaragua and Costa Rica in the terms of their respective concessions to the Maritime Canal Company have recognized said demand and such declaration of public policy by making their concessions to an association of Americans, in New York, and in making them a law of each of said Republics, and also by accepting a charter enacted by Congress, in which the Government of the United States is given full legislative, administrative, and political control over the conduct of said corporation in the provision reserving to Congress the right to alter, amend, or repeal the charter, and in requiring annual reports to be made, under oath, by the president and the secretary of said corporation, to the Secretary of the Interior.

Under the provisions of said charter the Maritime Canal Company, acting through its lawful authorities, proceeded to make contracts for the construction of said canal on the line of the survey made by A. G. Menocal and accepted by Nicaragua and Costa Rica, and said contracts are still subsisting and partly executed, and issues of stock and bonds remain to be made to such contractors in payment of their work, and other issues of stock and bonds and scrip for bonds sold for money or issued for work done remain in the hands of innocent holders for value,

nearly all of such holders of contracts, stock certificates, bonds, and of scrip for bonds being citizens of the United States.

The Government of Nicaragua has attempted and is still attempting to repudiate all of said obligations by declaring that the concession owned by the company shall not possess any legal validity after the 9th day of October, 1899, and that all rights under it will be forfeited on said date, which action of Nicaragua is in contravention of the rights of the Government of the United States and of its duty to protect its citizens against said wrongs and of the rights of American citizens who hold certificates of stock, bonds, and scrip for the bonds of said corporation, and it amounts to the unlawful confiscation of valuable property of the company in the Republic of Nicaragua.

Second. The right asserted and claimed by Nicaragua to declare that the concession to the company is forfeited, or that it will expire by limitation on the 9th day of October, 1899, is founded on a willful misconception of the true intent and meaning of said concession by said Republic.

No right to forfeit said concession is given by its provisions, either by express stipulation or by any just intendment based upon its provisions, because of the company's failure to complete said canal within the period of ten years from the date fixed for commencing work on said canal. Nor is there any such provision or just intendment that said concession will expire as to the rights and privileges therein granted to the company if said canal is not completed within such period of ten years.

Said concession provides for certain conditions precedent upon the performance of which certain rights of the company are made to depend, which conditions precedent are all set forth in said concession, with the penalties for nonperformance specifically provided.

The company, in due time and in full compliance with all of said conditions precedent, performed the same fully, and Nicaragua accepted such performance and confirmed to the company the full right to all the grants made in said concession according to its true intent and meaning, and thereupon Nicaragua became bound to keep and perform all its covenants, duties, and obligations to the company, as the same are provided in said concession.

There is no condition of forfeiture, express or implied, in said contract, whereby said concession or any right or privilege therein granted shall be forfeited if said canal shall not be completed by the company within the period of ten years, or any other fixed period. On the contrary, the time within which said canal could be completed by the exercise of the greatest diligence and good faith on the part of the company was so uncertain, by reason of the magnitude and novelty of the work, that the Government of Nicaragua, in article 48 of said concession, while fixing a period of ten years as a reasonable period for completing and opening said canal, did not attach any condition of forfeiture thereto for the failure to complete said canal within said period; and to exclude Nicaragua as a sovereign State from the power to declare such forfeiture for that cause, which might otherwise exist, a stipulation was provided in article 48 of said concession which bound Nicaragua to concede an extension of said ten years' period.

Third. The so-called contract made by Nicaragua with Messrs. Eyre and Cragin is an unlawful attempt to abrogate and repudiate the concession owned by the company while it is in full force and effect and to substitute a new grant to said Eyre and Cragin of the same property and rights heretofore sold and granted to the Maritime Canal Company.

The said grant to Messrs. Eyre and Cragin is illegal and void as against the Maritime Canal Company, and is an unwarrantable repudiation on the part of the Republic of Nicaragua of its obligations toward the said corporation, as will appear from the following facts:

(a) It was made in direct violation of Article V of the Menocal concession of April 24, 1887, which stipulates that "The State (Nicaragua) binds itself not to make any subsequent concession for the opening of a canal between the two oceans during the term of the present concession."

(b) It was made at a time when the ten years' period for the completion of the canal (if there is such a limitation of time) had not expired by more than eleven months and while the concession of April 24, 1887, is admitted by the provisions of said Eyre-Cragin contract to have been in full force.

(c) It was made in disregard and in defiance of the treaty of 1867 and of the act of Congress, which is based upon said Menocal concession, and adopts it as the body of the charter granted to the company on February 20, 1889, at the instance and request of Nicaragua, upon which act Nicaragua has joined other stockholders therein named in the organization of said corporation and in the conduct of its business, at a cost to citizens of the United States of more than four and a half millions of dollars.

(d) It was made in violation of article 48 of the Menocal concession, under which an absolute obligation is imposed upon the Republic of Nicaragua to extend the period of ten years for the completion of the canal. The company having fully complied with all the provisions of articles 8, 46, 47, and 49 of the said concession, and having spent a large amount of capital in the enterprise, and having encountered numerous difficulties in the prosecution of the work, the right of extension has become absolute. It is not discretionary with Nicaragua, but is expressly given to the company by the terms of the concession.

(e) It was made *ex parte* and without notice to the Maritime Canal Company, notwithstanding the fact that Nicaragua was represented on the board of directors of said corporation.

(f) It was made in violation of article 55 of the Menocal concession, which provides that any misunderstanding which may arise between the State of Nicaragua and the company in regard to the interpretation of the stipulations of the concession shall be submitted to a court of arbitrators, whose decision shall be final and without recourse.

(g) It was made in violation of the duty on the part of Nicaragua, as a stockholder and director in the Maritime Canal Company, to do justice to all creditors and other stockholders. Nicaragua can not lawfully renounce these duties and obligations because she is a sovereign State, but is bound by contract, by equitable duties, by her own statute laws, and by every form of estoppel to protect, defend, and preserve the rights of all to whom she holds this relation of trust; and especially she is bound to abstain from doing anything as a sovereign that violates these duties, contracts, and obligations.

(h) It was made without the consent of the Republic of Costa Rica, which State is entitled, under the treaty of limits of 1858, to the equal use and enjoyment with Nicaragua of the San Juan River, whose waters are indispensable to the construction of the canal. Under the award of President Cleveland, the consent of Costa Rica is necessary to any canal concession where her rights are affected.

(i) It was made on the day before the Republic of Nicaragua was, by previous treaty agreement with other Central American States, to lose its independent sovereignty by becoming one of the States of a new

union of States in a national agreement, to be called the United States of Central America.

(j) It was ratified by the executive against the solemn protest of the company's representative in Nicaragua, in violation of the laws of nations, and in opposition to the expressed wishes of the United States Government.

(k) It was made in violation of article 4 of the Menocal concession, which provides that the duration of the exclusive privilege to evacuate and operate a maritime canal granted by said Menocal concession shall be for ninety-nine years, to be counted from the day the canal shall be opened to universal traffic; and

(l) It was made in violation of the private rights of property and franchises granted in the said Menocal concession, which were paid for by private citizens of the United States, and are as valid and obligatory as if they were secured by formal treaty.

Fourth. The difficulties encountered by the Maritime Canal Company of Nicaragua in its efforts to complete the canal within the period of ten years named in article 48 of the Menocal concession, and the great capital the company has invested in the enterprise, and the good will and ability it has shown entitle the company to the full compliance with the covenant of Nicaragua in the contract that "the Republic binds itself to concede a new extension." The company has used every means and resource in its power to open the canal in good faith and with the greatest diligence, and is still doing all that is possible to that end. The work that has been accomplished and the moneys that have been expended in connection with the canal since the company was organized are fully set forth in the annual reports which have been made to the Secretary of the Interior of the United States by the company, as required by its charter, and reference is hereby made to said report for further particulars. The difficulties which the company has encountered in this great undertaking have not arisen from any fault or negligence on the part of the company, but have been due to circumstances over which it had no control. It has in all respects performed its duty in efforts to raise money to continue the work, whereas Nicaragua has placed many obstacles in the company's way, which have seriously injured the credit of the company and have disparaged the value of its concessions.

The following are some of the difficulties with which the company has had to contend, and which have seriously retarded the work of construction:

(a) The financial depression throughout the world caused by the panics of 1890 and 1893, and which prevented the successful floating of new enterprises. This condition of affairs brought about the insolvency of the company which held the contract for the construction of the canal and caused the long delay which ensued during the receivership of said corporation.

(b) The numerous wars, revolutions, and insurrections which have taken place in Nicaragua since the work has been under way, and which have produced a lack of confidence on the part of capitalists in the stability of the Government. Among these may be mentioned the following:

The revolution started in April, 1893, by the Conservatives of Granada; the revolution started in July, 1893, by the Liberals in Leon; the war with Honduras, to put in power President Bonilla; the revolution of the Leon Liberals against President Zelaya, February, 1896; the attempt of the Granada Conservatives to take a cuartel (Mono-

tombo), February, 1897; the rising of the Conservatives of Granada and Managua, and taking of the steamers *Victoria* and *Ometepe*, September, 1897; the revolution started by the political refugees in Costa Rica, February, 1898, and the rising of the governor of the former Mosquito and Atlantic coast, Juan Pablo Reyes, in connection with the Conservative party, February, 1899.

(c) The uncertainty as to the final location of the line of the canal. Congress has asserted its right to determine this line through Nicaragua and Costa Rica under their concessions to the Maritime Canal Company, by enacting laws to make surveys, in which commissions have been appointed and large sums appropriated for that ultimate purpose. Both of said Republics have given distinct recognition and approval of these enactments, and of the operations of the several commissions in pursuance thereof.

In article 24 of the concession of Nicaragua and article 12 of the concession of Costa Rica to the company the change of the final location of the axial line of the canal is provided for, through the action of the company, whenever a new survey "should show the necessity of adopting another line for the construction of the canal which varies wholly or in part from the line" previously adopted. (See article 13 of Nicaragua concession.)

The company, with the approval of Nicaragua, had selected the axial line established by the survey of A. G. Menocal as the line of final location and had proceeded with the work of opening the canal on that line, and had expended more than \$4,000,000 in that work when the Congress of the United States began to intervene to change the charter of the company by amendment, as it had the right to do.

After such intervention it became impossible to raise money by the sale of stocks or bonds of the company at any fair price in the money markets, and this, with the uncertainties as to the final location of the canal, prevented the company from prosecuting any active work on the canal.

(d) The obstruction interposed by Nicaragua to defeat legislation by Congress in aid of the company. The action of Congress in that behalf was based on its right and duty of giving all proper assistance to the opening of the canal, and it was taken, without any suggestion of the company, in the form of amendments to the charter of the corporation, which Congress had full and express right to make. Nicaragua, in diplomatic and other papers sent to the United States Government, made strenuous and persistent opposition to this action of Congress, and has assisted in defeating measures, of which there have been many in both Houses, that looked to giving aid to the company.

(e) The unlawful attempts which have been made by the Government of Nicaragua from time to time to disparage the value of the concessions and to repudiate its obligations thereunder. Among these the attention of the State Department is respectfully called to the following:

1. The attempt to prevent the company from obtaining a concession from Costa Rica, notwithstanding the fact that a concession from said Republic in that part of the San Juan River in which she had equal rights with Nicaragua was as essential to the canal as were the rights obtained from Nicaragua.

2. The protest filed against the Costa Rican concession to A. G. Menocal, granted August 9, 1888.

3. The decree issued in June, 1889, stopping the work of construction.

4. The ultimatum of September 16, 1889, declaring that plans must be submitted showing a canal entirely within the territory of Nicaragua

or the concession would be forfeited on October 24, 1889. This difficulty was removed by the intervention of the United States Government.

5. The letter of Minister Gamez, dated April 7, 1894, which was in effect a notification that Nicaragua regarded the company's concession as forfeited. This letter was subsequently withdrawn, through the intervention of the United States Government.

6. The letter of Minister J. D. Rodriguez to Secretary Olney, dated January 15, 1897, attacking the integrity of the company and its concessions.

7. The failure of Nicaragua to place the company in possession of the lands between Lake Nicaragua and the Pacific Ocean necessary for canal construction, for which \$50,000 was paid to the Government, as required in article 20 of the concession.

8. The failure of the Government of Nicaragua to place at the disposal of the company, free of all expenses and charges, the lands required for the construction of the Tapitapa Canal, as required by article 14 of the concession.

9. The failure of Nicaragua to protect the property of the company at Greytown, which was unlawfully seized and sold to satisfy the debts of another corporation, notwithstanding the protests of the United States authorities.

10. The attempt of Nicaragua, through Mr. J. La Motte Morgan, to compel the company to pay to that Republic 6 per cent of its bonded indebtedness in addition to the 6 per cent of its capital stock referred to in the concession.

11. The act of Nicaragua in granting to Messrs. Eyre and Cragin, on October 30, 1898, a so-called concession for the construction of the canal, to take effect October 10, 1899, thereby attempting to repudiate the lawful obligations of the said Government toward the company.

12. Other unfriendly acts on the part of Nicaragua toward the company, which have been open, manifest, continuous, and pronounced from the time when the United States interfered by executive action to protect the rights of the company and by legislative action to consider amendments to the charter granted to the company.

Fifth. The exclusive right to construct and operate the Nicaragua Canal is secured to the Maritime Canal Company of Nicaragua by contract and by the statutes of three Governments, and is a vested right. The lands, right of way, property, and privileges of the company are located in Nicaragua, and are for that reason incapable of being protected by any judgment or process of a court of law of the United States, and Nicaragua has attached the company's title and right of possession by an act of legislation, thus closing her courts to any remedy the company might otherwise be able to seek. Under these circumstances, there would seem to be a moral obligation on the part of the United States, the Government which chartered The Maritime Canal Company of Nicaragua, to protect the company, its stockholders and bondholders, and to see that they are not unjustly deprived of their vested rights.

A question of forfeiture of the concession for any cause or of the defeasance or expiration of the rights of the company under such concession necessarily involves a controversy as to the interpretations of the stipulations of said instrument or a misunderstanding, which entitles either party thereto to demand that it shall be settled by a court of arbitrators under section 55 of said concession; and the company appeals to the Government of the United States to secure to it that right which is vital to its existence and to the security of its corporate rights

granted by act of Congress against the arbitrary, extrajudicial, and oppressive power of Nicaragua as it is attempted to be exercised in the so-called concession granted to Messrs. Eyre and Cragin.

The Maritime Canal Company of Nicaragua therefore prays the assistance and intervention of the Government of the United States in the protection of its property and exclusive rights against the aforesaid arbitrary and unlawful acts of the Government of Nicaragua, and asks the Department of State to notify said Republic in positive terms:

First. That the United States will not remain passive while the vested rights of its citizens are being unlawfully destroyed, and that the arbitrary act of Nicaragua in declaring *ex parte* a forfeiture of the Cardenas-Menocal concession on the 9th day of October, 1899, will not be countenanced.

Second. That the questions which have been raised as to the proper interpretation of the stipulations of article 48 of said concession must be referred to and settled by the court of arbitration provided for in article 55.

Respectfully,

THE MARITIME CANAL COMPANY OF NICARAGUA,
By HIRAM HITCHCOCK, *President*.

EXHIBIT C.

OFFICE OF THE MARITIME CANAL COMPANY OF NICARAGUA,
54 Broad street, New York.

The SECRETARY OF STATE OF THE UNITED STATES.

SIR: The Maritime Canal Company of Nicaragua, chartered by act of Congress approved February 20, 1889, and owner of the exclusive privilege granted by the Republic of Nicaragua to A. G. Menocal on April 24, 1887, known as the Cardenas-Menocal concession, to excavate and operate a maritime canal across the territory of said Republic between the Atlantic and Pacific oceans, hereby renews, and in all respects confirms, the two protests dated December 2, 1898, and September 8, 1899, respectively, heretofore filed by the company in the Department of State, and hereby presents to the Government of the United States its further protest against the more recent and arbitrary and unlawful acts of the Republic of Nicaragua affecting the property and vested rights of said Maritime Canal Company of Nicaragua. The wrongs done to the said company and the grounds for protesting against the same are as follows:

First. In September, 1899, a copy of the protest of the Maritime Canal Company dated September 2, 1899, and hereinbefore referred to, was forwarded by the Department of State to the minister of the United States accredited to Nicaragua, with instructions to communicate the same to the Government of Nicaragua, with an expression of the hope and expectation of the Government of the United States that the Maritime Canal Company would be heard in defense of its claim.

Said protest contained, among other things, a demand that the questions raised, as therein set forth, in regard to the proper interpretation of the stipulations of articles 4, 5, and 48 of the Cardenas-Menocal concession of April 24, 1887, should be referred to and determined by the court of arbitration provided for in article 55 of said concession. On September 18, 1899, a protest was also lodged with the minister of

fomento of Nicaragua by the Maritime Canal Company, through its general agent residing in Managua.

Second. Article 55 of the said Cardenas-Menocal concession provides as follows:

"All misunderstandings that may arise between the State of Nicaragua and the company in regard to the interpretation of the present stipulations shall be submitted to a court of arbitrators composed of four members, *two of which shall be named by the State and two by the company.*

"*These arbitrators shall be designated by each of the parties within the period of four months from the day on which one of the contracting parties shall have informed the other in writing of the want of agreement on the point at issue.* Should one of the parties allow the aforesaid term to pass, it shall be considered as assenting to the opinion or claim of the other.

"The majority of the votes of the arbitrators shall decide finally and without recourse. In case of a tie vote the arbitrators shall select, by mutual consent, a fifth person, who shall decide. If unable to agree to such nomination, they shall draw by lot the names of the diplomatic representatives accredited to Nicaragua and the first one drawn out shall exercise the functions of the fifth arbitrator. He shall either adopt the opinion of one or the other of the parties to the controversy, or render his opinion between these extremes, and his decision shall be final and without any appeal whatever. The fifth arbitrator failing, the second person drawn shall exercise these functions, and so on successively until a decision is reached.

"Prior to the initiation of the works of opening the canal, *the Government shall formulate with the concurrence of the company* regulations in which shall be prescribed rules to be observed by the arbitrators in all matters relating to procedure.

"Questions between the company and individuals residing in Nicaragua shall be under the jurisdiction of the ordinary tribunals of Nicaragua, in conformity with the legislation of the country. In matters pertaining to nonresidents of Nicaragua the rules of international private law will be observed."

Third. A misunderstanding having arisen between the State of Nicaragua and the Maritime Canal Company in regard to the interpretations of the stipulations of the concession contained in articles 4, 5, and 48 thereof, the company, in compliance with the provisions of said article 55, informed the Government of Nicaragua in writing on October 7, 1899, of the want of agreement on the point at issue by delivering to the minister of fomento on said date, by its general agent in Managua, the following written notification:

MANAGUA, NICARAGUA, *October 5, 1899.*

HON. LEOPOLD RAMIREZ, M.,

Minister of Fomento, Managua, Nicaragua.

SIR: The contract entered into between the Government of Nicaragua and Messrs. Edward Eyre and Edward F. Cragin on October 31, 1898, contains a promise to grant to the Interoceanic Canal Company, a corporation to be formed as therein provided, the exclusive right in perpetuity for the construction of an interoceanic canal, after a recision of the Cardenas-Menocal concession shall be obtained or after it shall cease to have legal existence. Article 41 of the said Eyre-Cragin contract provides that the Cardenas-Menocal concession shall cease to have legal existence on the 9th day of October, 1899, and that all the stipu-

lations in said Eyre-Cragin contract specified shall take effect without necessity of further action, declaration, or law, on the 10th day of October, 1899.

It appears from the above that the Government of Nicaragua is of the opinion that by virtue of the provisions of article 48 of the Cardenas-Menocal concession it has the right to declare said contract terminated at the expiration of the term of ten years therein specified, whereas the Maritime Canal Company of Nicaragua, owner of the said concession, claims and insists that in consideration of the capital the company has invested in the enterprise, and of the good will and ability it has shown and the difficulties encountered, it is entitled under said article 48 to an extension of the said period of ten years within which the work of construction was to be completed. The company further claims that in view of article 4 of the Cardenas-Menocal concession, which provides that the exclusive privilege therein granted shall be for the duration of ninety-nine years, and article 5, by which Nicaragua binds itself not to make any subsequent concession for the opening of a canal between the two oceans during the term of said Cardenas-Menocal concession, the Republic of Nicaragua had no right or authority to grant to Messrs. Eyre and Cragin the agreement of October 31, 1898, and that, as against the Maritime Canal Company of Nicaragua, said agreement can be of no force and effect.

It is evident, therefore, that a misunderstanding has arisen between the State of Nicaragua and the company in regard to the * * * interpretation of the stipulations contained in articles 4, 5, and 48 of said Cardenas-Menocal concession, and the Maritime Canal Company of Nicaragua therefore demands that the said misunderstanding shall be submitted to a court of arbitrators, to be appointed as provided for in article 55 of said concession.

It therefore becomes my duty to notify the Government of Nicaragua of the want of agreement existing between the Republic and the company as to the above questions, and that the company elects to have the issues thus raised submitted to and determined by the court of arbitration provided for in article 55.

I have the honor to remain, sir, respectfully,

RUDOLF WIESER.

General Agent Maritime Canal Company of Nicaragua.

The above notice in writing having been served as aforesaid, the Maritime Canal Company thereupon designated Hon. William L. Merry and Mr. Rudolf Wieser as the two arbitrators to be appointed by the company, and on October 13, 1899, the president of Nicaragua and the minister of fomento were duly notified of such designation and appointment.

Fourth. On the 4th of November, 1899, the minister of fomento sent a written reply to the company's notification of October 5, 1899, in which he stated, among other things, that the Government of Nicaragua, for reasons which it did not choose to mention, did not admit the right of the Maritime Canal Company to an extension of the concession, as claimed by the company, and did not consider it a point of arbitration, but that the Government, being certain of the justice of its position, consented to name its arbitrators and would communicate to the company at a later date the names of the persons designated for that purpose. The minister also stated in this communication that the Government of Nicaragua refused to accept as arbitrators the persons named by the company on the ground that they were not citizens of Nicaragua,

and on the further ground that Mr. Wieser was the representative of the company, and that Mr. Merry was ineligible, as he was one of the diplomatic representatives who might be drawn under article 55 as the fifth arbitrator. The Government therefor notified the company that it must designate two other persons.

In reply to this communication the general agent of the company notified the minister of fomento on November 6, 1899, in writing, that under article 55 of the concession neither the Government of Nicaragua nor the company is restricted in the selection of arbitrators, and that each has unlimited right to appoint as such arbitrators whoever it may choose, without regard to their nationality. About the same time the State Department at Washington was notified of the refusal of the Government of Nicaragua to accept the arbitrators named by the company, and of the grounds upon which such refusal was based.

The President of the United States, in his message to the Fifty-sixth Congress, made the following reference to the Cardenas-Menocal concession:

"The contract of the Maritime Canal Company of Nicaragua was declared forfeited by the Nicaraguan Government on the 10th of October, on the ground of nonfulfillment within the ten years' term stipulated in the contract. The Maritime Canal Company has lodged a protest against this action, alleging rights in the premises which appear worthy of consideration. This Government expects that Nicaragua will afford the protestants a full and fair hearing upon the merits of the case."

On November 29, 1899, the United States minister accredited to Nicaragua wrote to the president of the company, stating, among other things, as follows:

"There is not even a pretense of a right to demand an exclusively Nicaraguan board; it is a requirement unfair and without precedent."

Fifth. Thereafter, and on or about the 28th day of December, 1899, the Secretary of State of the United States sent the United States minister accredited to Nicaragua the following letter of instructions, a copy of which was at the same time forwarded to the president of the company for his information:

[Copy No. 296.]

DEPARTMENT OF STATE,
Washington, December 28, 1899.

WILLIAM L. MERRY, Esq.,
San Jose, Costa Rica.

SIR: I have to acknowledge the receipt of your dispatch, No. 349, of the 29th ultimo, inclosing a copy of a note to you from the Nicaraguan minister for foreign affairs, in which he admits the right of the Maritime Canal Company of Nicaragua to demand the arbitration of the differences between his Government and the company, but imposes the condition that all four of the arbitrators provided for by article 55 of the concession must be Nicaraguan citizens.

Article 55 of the concession of the Nicaraguan Government to the Maritime Canal Company stipulates as follows:

"Any misunderstanding that may arise between the State of Nicaragua and the company in regard to the interpretation of the present stipulations shall be submitted to a court of arbitrators composed of four members, two of whom shall be appointed by the State and two by the company."

On the facts represented to the Department it appears to the Govern-

ment of the United States that the Maritime Canal Company is clearly entitled to demand the submission to arbitration of the question of its rights and the alleged forfeiture thereof, involving the interpretation of the various articles of the concession in dispute. It seems equally clear that in the selection of the arbitrators the company has the right to choose freely two of the arbitrators, and the Nicaraguan Government has an equal right to select two of them, and that neither party to the concession has or can have any right to impose any restriction or conditions upon the selection to be made by the other, and that the refusal of the Nicaraguan Government to make the submission except upon its own terms and conditions in the selection of the arbitrators would be a manifest breach of the contract.

You will therefore use your good offices in support of the demand of the company for arbitration and of its claim of right freely to select two of the arbitrators, regardless of the condition imposed by the Nicaraguan Government that the arbitrators must all be citizens of Nicaragua.

I am, sir, your obedient servant,

JOHN HAY.

Sixth. On the 23d of January, 1900, the following decree was issued by the President of Nicaragua and transmitted on the same date to the general agent of the company in Managua, viz:

The President of the Republic, bearing in mind that the representative of the Maritime Canal Company, Mr. Rudolf Wieser, under date of October 5, A. P., informed the Government of the interpretations which it gives to articles 4, 5, and 48 of the Cardenas-Menocal contract and of its intention to ask for a prolongation;

Considering that this interpretation is unjust, as well as the solicitude for an extension, the Government disregards both, and in this case arbitration will have to be carried into effect and verified by the appointment of the proper persons as arbitrators within the term of four months, counting from the date of the note of advice of the said representative of the Maritime Canal Company;

In the use of his faculties,

Decrees: First, appoint Messrs. Jose Dolores Rodriguez and Dr. Bruno H. Buitrago arbitrators on part of the Government, to inquire and resolve, together with those legally appointed by the Maritime Canal Company or its representative, in regard to the interpretation and extension the said company's claims. Second, the attorney-general will take the necessary steps in conformity with the laws of the Republic.

Communicate. Managua, January 23, 1900.

ZELAYA.

The acting minister of public works.

BERMUDEZ.

Seventh. Thereafter and on January 31, 1900, the company withdrew the designation of the Hon. William L. Merry as one of the arbitrators appointed by the company and designated Messrs. Aniceto G. Menocal and Rudolph Wieser as the company's appointees. This change was communicated to the Government within the four months' period specified in article 55 by the following letter:

MANAGUA, NICARAGUA, *January 31, 1900.*

The Hon. Dr. LEOPOLDE RAMIREZ, M.,

Minister of Public Works, P.

SIR: I have the honor of notifying you that the Maritime Canal Company of Nicaragua has appointed Mr. Aniceto G. Menocal and myself as arbitrators, the former to replace the Hon. Mr. Merry.

As I have not received an acknowledgment of my letter to you dated November 6, 1899, I take the liberty of inclosing a copy of the same.

Further, permit me to remark that the refusal of the Nicaraguan Government to arbitrate upon its own terms and conditions in the selection of the arbitrators would be a manifest breach of the contract.

Very respectfully, yours,

RUDOLPH WIESER,

General Agent Maritime Canal Company of Nicaragua.

Eighth. On February 1, 1900, notwithstanding the fact that the Maritime Canal Company had in all respects fully complied with the provisions of article 55 of the concessions under which the Government of Nicaragua had agreed to arbitrate the questions at issue with the company, the said Government, in disregard and direct contravention of the terms of said article, instituted proceedings in the local courts of the Republic to compel the company to appoint citizens of Nicaragua as its arbitrators. The judge of the second district court called upon the general agent of the company in Managua with documents providing for a method of arbitration not consistent with the provisions of article 55, which documents he requested the said agent to sign. Upon the latter's refusal to execute these papers, the said judge cited him to appear before him in court within the period of three days. On the 3d day of February, 1900, being the last day of grace, the general agent of the company appeared before the said judge, stated he was there under protest, and refused to recognize the validity of the proceedings or to sign the documents submitted to him, for the reason that they prescribed a method of arbitration inconsistent with the provisions of article 55 of the concession and in violation of the rights of the Maritime Canal Company under said concession. The general agent of the company immediately thereafter filed his protest with the United States consul at Managua against the unjust action of the Government of Nicaragua in summoning him before the said judge of the district court and appealed to said consul in his official capacity for protection for the Maritime Canal Company.

Ninth. The company having declined to acquiescé in an arbitration to be conducted through the local courts in violation of the provisions of article 55, the judge of the second district court issued a decree declaring the concession forfeited on account of the alleged failure of the company to appoint arbitrators within the period of four months, as provided for by article 55 of the concession, thereby completely ignoring and refusing to recognize the designation of Messrs. Aniceto G. Menocal and Rudolf Wieser duly made by the company on January 31, 1900, as hereinbefore stated. On February 26, 1900, the company filed its protest against this decree of forfeiture and against the unjust action of Nicaragua in taking the matter before the local tribunals, but said protest was rejected by the Government of Nicaragua.

The company is advised that this adverse action of the Government of Nicaragua was taken after the receipt, from its representative in Washington, of a dispatch stating that the United States Government, having given the subject of the proposed arbitration further attention and having obtained the opinion of the Attorney-General, had changed its mind as to the qualifications of arbitrators and recognized the justice of Nicaragua's claim that all four arbitrators should be citizens of Nicaragua. In view of Secretary Hay's letter to Mr. Merry, of December 28, 1899, the company is satisfied that this statement of the Nicaraguan minister at Washington was entirely incorrect, as the records of the State Department will doubtless show.

Tenth. The refusal of the Government of Nicaragua to accept the arbitrators designated by the Maritime Canal Company was based upon the Government's claim that the arbitrators referred to in article 55 are judges at law and not mere arbitrators, and that under Nicaraguan law judges must be citizens of the Republic. As the rules of procedure referred to in article 55 had not been formulated, the Government claimed the right to organize a tribunal of arbitration by judges under the jurisdiction of the local courts and the general laws of Nicaragua, thereby ignoring and disregarding the provisions of article 55 of the concession, which clearly provide for a special court of arbitration to pass upon all differences which may arise between the contracting parties.* Having refused to recognize the arbitrators appointed by the company, the Government proceeded to treat the case as though no appointments whatever had been made, and to declare that the question in dispute had been decided in favor of the Government, because of the failure of the company to appoint arbitrators within the four months' period provided for by article 55.

The minister of fomento, in his letter to Mr. Wieser, dated March 2, 1900, claims that the arbitrators referred to in article 55 of the concession, must be deemed judges according to law, and that therefore it was proper that the ordinary judges of the Republic should organize the tribunal or arbitration with persons possessing all the qualities which judges are required by law to possess, one of which is that such judges must enjoy the full rights of citizenship. The minister also claims in his letter that the designation of arbitrators made by the company within the four months' period specified in article 55 was void and to be treated as if such appointment had never been made at all, for two reasons.

First, because the appointment should have been made before a judge; and, secondly, because parties appointed were disqualified by reason of their relations to the company. The minister entirely ignored the fact that the original designation of arbitrators by the Government of Nicaragua was made on January 23, 1900, by a decree of the President and not before a judge, and also that the arbitrators named by the company were no more disqualified by reason of their connection with the corporation than was Mr. Jose Dolores Rodriguez, who had represented the Government of Nicaragua on several occasions in matters relating to the canal, and who, on the 15th day of January, 1897, had addressed to the Hon. Richard Olney, Secretary of State of the United States, at Washington, a communication attacking the integrity of the Maritime Canal Company and claiming in behalf of Nicaragua that its rights had been forfeited. The minister of fomento closed his letter of March 2, 1900, by stating that the forfeiture of the concession took effect *ipso jure*, because arbitrators had not been appointed by the company in proper time and in proper form, and the company had therefore been considered as assenting to the claim of the Government.

It will be seen, therefore, that the Government frankly admits that it arbitrarily treated as null and void the appointment of arbitrators made by the company, and then caused a forfeiture of the concession to be declared in the local courts because of the company's alleged failure to designate arbitrators under the provisions of article 55.

The company submits that this arbitrary and unwarranted action on the part of the Government of Nicaragua was a manifest breach of the Cardenas-Menocal contract.

Eleventh. The Government of Nicaragua, having arbitrarily and unlawfully attempted to deprive the company of its vested rights in

the Cardenas-Menocal concession without affording the company the hearing on the merits provided for in article 55 and expected by the United States, proceeded, without lawful authority, to seize and confiscate the property of the corporation situated at Greytown, claiming to be entitled to the same under article 54 of the concession. On August 10, 1900, Messrs. Chamberlain and Jeffries, representing the Government of Nicaragua, and accompanied by 60 laborers, seized and took possession of the company's railroad, locomotives, and rolling stock, notwithstanding the protests of the watchman in charge of the property at Greytown, and proceeded to tear up the rails and remove them. On the 12th day of August, 1900, the governor of Greytown, acting under instructions from the Nicaraguan Government, went to La Fe, sealed all the buildings of the company with his official seal, and notified the watchman in charge that by orders of the Government he took possession of everything belonging to the corporation. A protest was promptly lodged with the United States consul at Greytown, in the name of the Maritime Canal Company, against the action taken by the Government of Nicaragua and its representatives in seizing, taking, and removing the property at Greytown belonging to the company. The intention of the Government to seize and confiscate the property of the Maritime Canal Company was communicated to the agent of the canal company by the minister of public works in the following communication:

[Translation.]

AUGUST, 1900.

Mr. AGENT OF THE MARITIME CANAL COMPANY, Present:

According to article 54 of the contract celebrated for the opening of an interoceanic canal with Mr. A. G. Menocal, on the 24th of April, 1887, which concession was ceded to the company you represent, I herewith give you notice that said contract having been declared forfeited, the Republic of Nicaragua enters into possession in perpetuity of the existing materials belonging to the Maritime Canal Company, which were used to initiate some work done on the canal at Ciudad America and the San Juan River, as belonging to those comprised and classified in article 54. In consequence of this, and in order to specify and class said existing materials so that it shall not be said later on that the Government has exceeded its authority, or that other different statements shall be made, I wish that you personally, or through a representative in the character of agent of the Maritime Canal Company of Nicaragua, be present on the 20th of this month, in the city of San Juan del Norte, at the solemn act of making the investiture, which shall be made by the governor and "intendent" of said district jointly with other employees of the Government, and before the consul or consuls of other nations which are established at that place, in order to give greater publicity to this act.

Hoping you will acknowledge the receipt of this communication, I am,
Your obedient servant,

RAMIREZ,
Minister of Public Works.

The Government of Nicaragua is now engaged in tearing up the rails of the road which was constructed by the company at great cost, and is unlawfully confiscating the same and removing them to the interior, where they are being used in the construction of Government railways. The Government is also in unlawful possession of the other property

of the company at Greytown, and has declared its intention of confiscating and removing all available material, rolling stock, tools, implements, and other property, and of transferring the same to the interior. The company has protested and is still protesting against these arbitrary and unwarranted acts on the part of the Government of Nicaragua, but it has been refused protection by the Government of Nicaragua, and its protests have been entirely ignored.

Twelfth. Article 55 of the Cardenas-Menocal concession provides that before the initiation of the works of opening the canal the Government, with the concurrence of the company, shall formulate regulations in which shall be prescribed the rules by which the arbitrators are to be governed in all matters relating to procedure. This provision relates only to the preparation of rules under which the arbitrators are to proceed after they have been appointed. There is nothing in the concession providing that the arbitrators are to be appointed either as prescribed in these rules or under the jurisdiction of the local courts of Nicaragua. On the contrary, article 55 states the precise manner in which these arbitrators are to be appointed—two of them to be named by the State and two by the company—and the rules referred to are those prescribing a method of procedure to be followed by the arbitrators after their appointment. By article 55 the duty of preparing these rules is placed upon the Government of Nicaragua, which must take the initiative; but such rules can have no force or effect until they are approved and concurred in by the company. The fact that no rules have been adopted up to the present time is due to the failure of Nicaragua to formulate the regulations required by article 55, and the company can in no way be prejudiced by this neglect of the Government. The local courts of Nicaragua have no jurisdiction whatever over the board of arbitrators provided for in article 55, except to see that their judgment is enforced, and the board's method of procedure is not restricted to that provided by the general laws of Nicaragua.

The said article 55 provides that all questions which may arise between the company and individuals residing in Nicaragua shall be determined by the ordinary tribunals of Nicaragua, in accordance with the law of the country, and that as to questions arising between the company and nonresidents of Nicaragua the rules of private international law shall be observed. The exact manner of litigating disputes between the company on the one part and residents or nonresidents on the other is therefore expressly determined by the concession, which also provides in express terms the method of disposing of all questions which may arise between the Government and the company in reference to said concession. All misunderstandings between the two contracting parties in regard to the interpretation of the stipulations of the concession are to be submitted to a tribunal of arbitrators composed of four members, two of whom shall be named by the State and two by the company, and the decision of a majority of these arbitrators is to be final and without appeal.

The only restrictions placed upon this court of arbitration are the rules as to procedure, which are to be adopted by agreement between the company and the Government. This provision of the concession clearly creates a special court of arbitration for the determination of questions affecting the proper construction to be given to the articles of said concession, such court to consist of arbitrators to be appointed by both parties to the controversy and to be governed by rules of procedure to be agreed upon by both sides. Nicaragua, in agreeing to this court of arbitration, has waived any right she might have had to pro-

ceed against the company in the local courts of the Republic in matters covered by article 55, and the jurisdiction of these courts is limited to questions arising between the corporation and individuals residing within the boundaries of the Republic. The very object of creating this court of arbitration was to prevent any arbitrary action being taken against the company by the Government of Nicaragua through the medium of its partisan local tribunals.

As to the selection of arbitrators, it may be that either Nicaragua or the company would have the right, under a strict interpretation of article 55, to object to the nomination of any person who might be eligible as the fifth arbitrator in case of a disagreement between the four named by both parties, and for this reason the company withdrew the original appointment of Mr. William L. Merry and designated in his stead Mr. A. G. Menocal. Except as to the possible limitation above referred to, the concession clearly gives the company the absolute right to select and appoint two of the four arbitrators without any restrictions whatever, and the contention of the Government of Nicaragua that the arbitrators named by the corporation must be citizens of the Republic is without the slightest foundation and can not be sustained. Such a construction of article 55 would defeat the very object to accomplish which the court of arbitration was created. The controversy which has arisen under articles 4, 5, and 48 is one between the Government of Nicaragua and a foreign corporation created by the Congress of the United States. The right of the company to name United States citizens as its appointees is just as absolute under article 55 as is Nicaragua's right to name its own citizens as the appointees of that Republic, and, as already stated, this right is one which has been fully recognized by the Department of State of the United States.

- Thirteenth. The Government of Nicaragua has attempted to draw a distinction between "arbiter" (arbitro) and "arbitrator" (arbitrador), claiming that the word "arbitro" used in article 55 of the concession means a "judge," according to law, and not an arbitrator, as claimed by the company. In Spanish dictionaries the word "arbitro" is defined as being an arbitrator or referee chosen by the parties to settle a difference, and an "arbitrador" is defined as an arbiter, umpire, or referee, to whom any disputed matter is left for decision. There seems to be absolutely no difference in the meaning of these two words as used in law, and they are as synonymous in the Spanish language as they are in the English language. Both arbiters (arbitros) and arbitrators (arbitradores) are persons to whose judgment or decision matters in dispute are submitted by the consent of parties. They decide according to their best judgment on principles of equity, after a full hearing of the cases referred to them, and their powers in this respect are only limited by the provisions of the arbitration agreement under which the controversy is submitted. A "judge" (juez), on the other hand, is an officer lawfully appointed or elected, who acts under the government and who decides questions and disputes in a court of justice according to law. Citizenship may be a necessary qualification for a "judge" who is called upon to administer the laws of the Republic, but it is not a necessary requirement in the case of an "arbiter" or "arbitrator" chosen by parties to determine the merits of a controversy.

Whatever may be the provisions of the statutes of Nicaragua in reference to the qualifications of judges, the company has not been able to find, nor have the officials of Nicaragua been able to point out, any law providing in expressed terms that an arbiter (arbitro) must be

a citizen of Nicaragua. That the Congress of Nicaragua did not use the word "arbitro" in the Cardenas-Menocal concession with any such limited meaning is proved by the provisions contained in article 55 for the selection of a fifth arbitrator. In case of a tie vote, the four arbitrators (arbitros) are to name by mutual consent a fifth arbitrator (arbitro), whose decision shall be final. If unable to agree to such nomination, they must draw by lot the names of the diplomatic representatives accredited to Nicaragua, and the person whose name is first drawn shall exercise the functions of the fifth arbitrator (les funciones de quinto arbitro). As none of the diplomatic representatives accredited to Nicaragua are likely to be citizens of that Republic, it is quite clear that it was never intended by the Congress of Nicaragua to require that the court of arbitrators should be composed exclusively of Nicaraguan citizens. The Cardenas-Menocal concession was an act of the legislative and executive branches of the Government, and its provisions creating a court of arbitration are legally binding upon the Republic as well as upon the company.

Fourteenth. The Maritime Canal Company of Nicaragua duly notified the Government of Nicaragua of its intention to arbitrate the questions which have arisen in reference to articles 4, 5, and 48 of the concession, and the Government of Nicaragua agreed to submit the matter to the court of arbitration provided for in article 55. The company duly appointed Messrs. Rudolf Wieser and A. G. Menocal as its arbitrators, and the Government selected Messrs. J. D. Rodriguez and Bruno H. Buitrago as arbitrators on behalf of the Republic. The Government of Nicaragua then arbitrarily refused to recognize the appointments made by the company, and declined absolutely to arbitrate the questions at issue before the four arbitrators named as aforesaid. Notwithstanding the company's protests, the Government then instituted proceedings in the local courts of Nicaragua in contravention of the provisions of article 55 of the concession, and obtained in said tribunals a declaration of forfeiture of the Cardenas-Menocal concession. This declaration of forfeiture not having been pronounced in conformity with the provisions of the concession can have no binding force whatever, and the Government of Nicaragua in refusing to make the submission to the court of arbitrators except upon its own terms and conditions in the selection of arbitrators has been guilty of a manifest breach of contract.

Fifteenth. The Maritime Canal Company of Nicaragua, for the reasons above stated, hereby enters its solemn protest with the Department of State of the United States against the arbitrary, unlawful, and oppressive acts of the Government of Nicaragua.

(1) In declining to arbitrate the matters in controversy in the manner provided for by article 55 of the Cardenas-Menocal concession, and in refusing to recognize and in treating as null and void the appointment of Messrs. R. Wieser and A. G. Menocal as arbitrators, duly made by the company in conformity with the provisions of said article 55.

(2) In refusing, after the appointment of arbitrators, to proceed with the arbitration in the manner prescribed by said article 55, and in violating the provisions of the said concession by instituting proceedings against the corporation in the local tribunals of Nicaragua.

(3) In declaring a forfeiture of the said Cardenas-Menocal concession before the questions raised as to the interpretation of articles 4, 5 and 48 had been properly submitted to the tribunal of arbitrator specified in said article 55.

(4) In illegally seizing and confiscating the property and vested rights of the Maritime Canal Company, and in refusing to surrender the same.

Sixteenth. The Government of Nicaragua is responsible to the United States for the wrongs perpetrated by Nicaragua against the Maritime Canal Company of Nicaragua. These wrongs form an equally just ground for complaint on the part of the United States, whether they proceed from the direct agency of the Government of Nicaragua or were inflicted by the instrumentality of the tribunals of that Republic. The authority of Nicaragua within its own territory is the absolute and exclusive authority of a sovereign power, and the company has absolutely no other mode of redress or protection against the wrongs which have been inflicted upon its bondholders and stockholders by the Government of Nicaragua except through the intervention of the United States.

Mr. Cass, Secretary of State, in his communication to Mr. Lamar of July 25, 1858, states:

"What the United States demand is that in all cases where their citizens have entered into a contract with the proper Nicaraguan authorities, and questions have arisen or shall arise respecting the fidelity of their execution, no declarations of forfeiture, either past or to come, shall possess any binding force unless pronounced in conformity with the provisions of the contract, if there are any, or if there is no provision for that purpose, then unless there has been a fair and impartial investigation in such a manner as to satisfy the United States that the proceeding has been just and that the decision ought to be submitted to. Without some security of this kind this Government will consider itself warranted, whenever a proper case arises, in interposing such means as it may think justifiable in behalf of its citizens who may have been or who may be injured by such unjust assumption of power."

The Department of State, in the communication of Secretary Hay, dated December 28, 1899, recognized the right of the company under article 55 of the concession to choose freely two of the arbitrators and that the refusal of the Nicaraguan Government to make the submission except upon its own terms and conditions in the selection of the arbitrators would be a manifest breach of the contract. This breach of contract having taken place, the United States can not justly permit the Government of Nicaragua to wrongfully destroy and confiscate the vested rights and property of the Maritime Canal Company of Nicaragua, a corporation which it has itself chartered, and should, if necessary, employ its sovereign powers to protect the company against the wrongs done to said corporation by the said Government of Nicaragua.

Wherefore the Maritime Canal Company of Nicaragua prays the assistance and intervention of the Government of the United States in obtaining from the Government of Nicaragua a full and complete recognition of the rights of the company under the Cardenas-Menocal concession and in protecting from wrongful seizure and confiscation property and rights justly acquired and solemnly guaranteed.

Dated New York, October 23, 1900.

Respectfully,

THE MARITIME CANAL COMPANY OF NICARAGUA,
By HIRAM HITCHCOCK, *President*.

Senator KITTREDGE. That represents the attitude of your company to-day?

Mr. ATKINS. Yes, sir.

Senator KITTREDGE. So that your company and its stockholders intend to assert their rights to the exclusive franchise granted them by the concessions from Nicaragua and Costa Rica?

Mr. ATKINS. We intend to do so, but we can only do so so far as supported by our Government.

Senator KITTREDGE. What is your understanding of the attitude that this Government has already taken in regard to recognition of these rights?

Mr. ATKINS. It has always been protective to us. We have nothing to say with regard to the attitude the Government has observed toward the canal company except to thank it for its protection.

Senator KITTREDGE. Which you understand that it has done and expects to do.

Mr. ATKINS. We hope so.

Senator KITTREDGE. In the event that the United States Government takes the Nicaragua route, what is the purpose, if any, of your company and your stockholders in regard to that claim?

Mr. ATKINS. Well, I think I can state that better than in any other way by referring to its attitude in the past. It has always regarded itself as the creature of the Government of the United States, and ready to accept whatever conditions the Government saw fit to impose. That can be determined by Senate bill 4827, I think, of Fifty-first Congress, second session. Some years ago the president of the company was asked, I think by Senator Sherman, what amount of money it had expended in the work, and for what amount the company would be willing to step aside and allow the Government to assume the canal work. Mr. Hitchcock, the president of the company, then answered Senator Sherman, or possibly Senator Morgan, I will not be sure which, I think Senator Sherman, saying that the company had expended something over \$4,000,000, or about \$4,000,000 in the work, and if they were reimbursed they would willingly step aside; or if the Government thought fit, the feeling of the company was sufficiently patriotic to sacrifice all that it had put into the work and let the Government do what they would with the canal work as it was.

After that interview Mr. Hitchcock came to the board of the canal company and stated what he had said, and the matter was discussed, and the board of the canal company approved his report and the position that he had taken, and said that they agreed with him, that if the Government did not see fit to reimburse them, that as citizens of the country, and with the desire to see the canal constructed, they would step aside and relinquish any right or interest that they might consider that they had in the work. That has always been the attitude of the company.

Senator HANNA. Is that a matter of record on the books of the company?

Mr. ATKINS. My impression is that it is. My impression is that the record on the books of the company is that Mr. Hitchcock stated to the board what he had stated in this interview, and that his statement was approved by the board.

Senator HANNA. If that is of record, of course the record is in your possession?

Mr. ATKINS. Yes, sir.

Senator HANNA. Can you attach a copy of that to your testimony?

Mr. ATKINS. If I can find it, I will do so. It may be that it is not recorded in so full a form as I have stated it.

Senator HANNA. But whatever the record will show.

Mr. ATKINS. The record will probably simply show a report by Mr.

Hitchcock of his interview with the Government officials, and a corroboration of his attitude. I think you will bear me out in the statement that in a business transaction of that kind it would not be likely that all the details of a proposition would be recorded, and more particularly the amount of values, for the reason that such records are always subject to inspection, and would give the public access to things which should be a matter of a private knowledge only.

Senator HANNA. I should like to see what the records show on that point.

Mr. ATKINS. All right; I will see what I can find.

I have made the inspection of the records of the company requested by Senator Hanna and fail to find any mention there of what I have said Mr. Hitchcock reported concerning his interview with and statement to either Senator Sherman or Senator Morgan. I am, however, entirely confident that Mr. Hitchcock made the statement as I have testified, though it may not have been at a meeting of the board of directors.

The CHAIRMAN. You spoke of a declaration made by Mr. Hitchcock to Senator Sherman and myself. You used our names.

Mr. ATKINS. Yes, sir.

The CHAIRMAN. Were those statements made to the persons you refer to as members of the Committee on Foreign Relations of the Senate?

Mr. ATKINS. Yes.

The CHAIRMAN. Do you recollect whether they were made to a session of the Committee on Foreign Relations?

Mr. ATKINS. I do not remember. I think not. I think the statement was made to members of the committee with reference to the preparation of the bill that you were speaking about at that time.

The CHAIRMAN. I remember stating the fact to the Senate.

Senator KITTREDGE. What was the general nature of the bill to which you refer?

Mr. ATKINS. The general nature of the bill provides for the assignment substantially of the whole enterprise to the Government on payment of \$4,000,000.

Senator KITTREDGE. Has any formal action been taken by your stockholders or directors in the line you have just been speaking of?

Mr. ATKINS. No, sir; the matter was never in a position to put before them for their formal consideration. It was never in the shape of a proposition.

Senator KITTREDGE. Do you consider that the action of our Government sustaining your protest against the forfeiture of franchises and concessions by Nicaragua and Costa Rica, in a way, is an official recognition of the rights of your company in the premises?

Mr. ATKINS. Well, we have always considered that we were officially recognized by the Government, and we have felt that our rights were rights that the Government ought to preserve for their own benefit. We have assumed that the canal would ultimately be built by the Government of the United States, and it was our duty, as well as our obligation, to protect our rights by every act that could assure them in any way. So these protests that we have filed will, in our opinion, enable the Government to assert rights under our concession which otherwise it could not avail itself of, because they would have been relinquished by our default.

The CHAIRMAN. You do not know anything about whether the Government has made any such use of your protests?

Mr. ATKINS. No, sir.

Senator KITTREDGE. Then, according to your understanding, the concession from Nicaragua and Costa Rica to the Maritime Canal Company is still in force?

Mr. ATKINS. Yes, sir, without question.

Senator KITTREDGE. How large a tract of country is covered by your concessions or franchises?

Mr. ATKINS. I could not answer that without investigation. It includes alternate sections of land all along the route and the police control of the entire line of the canal and all that kind of thing. It would need a pretty lengthy investigation to determine just how much that is.

The CHAIRMAN. Allow me to remark that every bit of that is provided for distinctly in the concessions.

Senator KITTREDGE. That is just what I wanted to get at.

The CHAIRMAN. You include nothing except what is in the concessions?

Mr. ATKINS. Nothing but what is in the concessions.

Senator KITTREDGE. Then the land that is claimed is covered by your concessions?

Mr. ATKINS. Entirely. There are lands which we have bought which have never been delivered to us, but that is under the concession.

Senator KITTREDGE. Where is the tract of land located that you have just mentioned?

Mr. ATKINS. On the route, between the lake and Brito.

Senator KITTREDGE. How extensive is that tract?

Mr. ATKINS. It is an area of 1,000 manzanas, as provided for in Article XX of the concession.

Senator KITTREDGE. Where is that located with reference to the line of the proposed canal?

Mr. ATKINS. I think that it is practically the right of way of the canal; that is, so far as my recollection goes.

Senator KITTREDGE. Is there any in addition to the right of way of the canal?

Mr. ATKINS. Yes; this 1,000 manzanas is in addition to the right of way; that is, as I understand it.

Senator KITTREDGE. Where is that located?

Mr. ATKINS. It is practically an addition to the right of way.

Senator KITTREDGE. Is it adjoining it?

Mr. ATKINS. It is adjoining it, so far as my knowledge goes.

Senator KITTREDGE. In what condition is your title to that land?

Mr. ATKINS. Well, it would be difficult to answer that question. We have paid the money for it to the Government of Nicaragua and are entitled to receive the delivery of the lands, but they have never been delivered to us.

Senator KITTREDGE. How much did you pay for such lands?

Mr. ATKINS. I do not recollect exactly; I think it was \$50,000.

Senator KITTREDGE. Are you able to state that after an inspection of your books?

Mr. ATKINS. Yes.

Senator KITTREDGE. Will you do so and add that statement to your testimony?

Mr. ATKINS. Yes, sir. On inspection I find that we paid \$50,000. It is so stated in our second protest to Secretary Hay.

Senator KITTREDGE. In what manner was that \$50,000 paid?

Mr. ATKINS. It was paid by a draft for the money, handed to a Government official of the Government of Nicaragua.

Senator KITTREDGE. And that draft was paid?

Mr. ATKINS. It was paid. That was not our own draft, but it was a draft that we bought and paid for.

Senator KITTREDGE. Have you ever abandoned your right to this land?

Mr. ATKINS. No, sir; we have always asserted it.

Senator KITTREDGE. How do you expect to act in support of that claim of right?

Mr. ATKINS. That depends entirely upon the support given us by the Government of the United States. If the Government of the United States protects us in the assertion of these claims, we shall assert them before the Government of Nicaragua, as well as all other things.

Senator KITTREDGE. So that this tract of land is also included in the right that you look to this Government to protect?

Mr. ATKINS. Exactly. Pardon me, but your questions rather imply that the land might have been acquired possibly by somebody else besides the canal company. Whatever lands there are have always been acquired by the company itself and by no individuals whatever. They are all the acquisitions of the company.

Senator KITTREDGE. And have none of your officers, agents, or stockholders acquired land?

Mr. ATKINS. Not to my knowledge.

Senator KITTREDGE. As individuals?

Mr. ATKINS. Not to my knowledge. I think that Admiral Ammen, who was formerly a stockholder and director in the company, received a very considerable grant from the Government of Nicaragua, but not in any way as I am aware of as connected with the canal company.

The CHAIRMAN. That was a gift by the Government of Nicaragua to Admiral Ammen's children, was it not?

Mr. ATKINS. Yes, sir; it was to Admiral Ammen's children.

The CHAIRMAN. Do you not know that Admiral Ammen at first declined to receive it, and that the Government of Nicaragua pressed it upon him?

Mr. ATKINS. I have some recollection of that, but indistinctly. I know that it was, as you say, a gift to his children.

The CHAIRMAN. And that the grant was made in consideration of the friendship that he had shown to the Government of Nicaragua in his examination of the country?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. In exploring it?

Mr. ATKINS. Yes; as I said, it was entirely independent of any connection with the canal. It had no connection with the canal.

The CHAIRMAN. The land you speak of is on the island of Ometepe, is it not?

Mr. ATKINS. Yes, sir; it is on the island of Ometepe.

The CHAIRMAN. It is a very small body of land?

Mr. ATKINS. The land there could not be sold for anything, so that you can not consider it of much value.

Senator KITTREDGE. Does the Maritime Canal Company expect to make a demand for damages for loss of concessions or loss of property?

Mr. ATKINS. If that were considered advisable on the part of the Government of the United States, yes. We consider that we have suffered damages, and that we are justly entitled to compensation, and

in any such matter as that I should assume that we should do what the Government advised.

Senator KITTREDGE. Has your company ever made any such demand?

Mr. ATKINS. We have protested against the damage done us in several instances, but have not proceeded so far as to formulate the amount of damage suffered or to make a demand for it.

The CHAIRMAN. When you say you protested, you mean these written protests lodged with the Secretary of State?

Mr. ATKINS. Yes, sir; and also such protests as we have made to the officials in Nicaragua.

The CHAIRMAN. They are copies of these, are they not?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. You have protested alike to both Governments in the same words?

Mr. ATKINS. Yes, sir.

Senator KITTREDGE. In the event they refuse, what would be the action of your company?

Mr. ATKINS. Well, I doubt whether we could do anything, unless the Government of the United States supported us.

Senator KITTREDGE. Would you ask the Government of the United States to assist you in enforcing your claim?

Mr. ATKINS. If the Government considered that the property was desirable to be possessed, we should expect our claim to be enforced as being a benefit in addition to the property acquired.

Senator HANNA. That is not exactly the spirit of the question.

Mr. ATKINS. The spirit of the question, sir, rather implies that we should look to acquiring this property ourselves and to benefitting by the acquisition of it. I do not think that has been the attitude of our company. I think that in our present position the property can not be acquired except the Government desires to acquire it.

Senator HANNA. What you mean by that is that you would not make any effort to acquire it?

Mr. ATKINS. We would make every effort in our power to acquire it.

Senator HANNA. Independent of the United States Government?

Mr. ATKINS. I think we can not.

Senator HANNA. But you would make the effort independent of the United States Government?

Mr. ATKINS. I can not speak for the board, but personally I should say no. I can not speak for the board of directors or for our company, but my opinion is that it would be futile to attempt anything without the assistance of the Government of the United States.

Senator KITTREDGE. In the event the United States selects the Nicaragua route for the canal, and agrees, as a part of the negotiations, to pay a certain sum to Nicaragua and Costa Rica for the concessions, what if any action would your company take in reference to attaching or seeking to hold that money?

Mr. ATKINS. Well, I can not speak for the others, but so far as my judgment of their disposition is concerned, I should say not any.

Senator KITTREDGE. Are you able to speak for the other stockholders and directors?

Mr. ATKINS. No, sir.

Senator KITTREDGE. Has the matter ever been discussed or considered?

Mr. ATKINS. No, sir.

Senator KITTREDGE. By anyone in your presence?

Mr. ATKINS. No, sir. I assume that the Government would not make such a proposition to Nicaragua, and entirely disregard the rights of the Maritime Canal Company.

Senator KITTREDGE. In other words, you understand that the United States will not enter into any negotiations for the purchase of concessions from Nicaragua or Costa Rica without taking into account and adjusting your claim?

Mr. ATKINS. I do not understand anything. I assume merely that the Government of the United States would act equitably in the whole matter, and whatever they might consider equitable I believe that the canal company would accept.

Senator KITTREDGE. Do you expect that the Government of the United States will take into consideration your claims for loss of property in adjusting this matter with Nicaragua and Costa Rica?

Mr. ATKINS. I can not say that I expect anything in the present position of affairs.

Senator KITTREDGE. Do you intend to press your claim in that direction?

Mr. ATKINS. Not that I am aware of. I have no intention on that point. I think that question and all the questions in that connection have been answered by my statements of what the attitude of the company was toward the United States in the past, and that it was willing and ready to surrender all that it had then for a reimbursement, or if it was the judgment of the United States that, as citizens of the country, the company should surrender them without any reimbursement or without any compensation, it was ready to submit. I think that attitude is the same as would be observed by the company in the future, and it appears to me that those questions are all answered in that way.

Senator KITTREDGE. What I am trying to get at is this: Suppose the Government takes this Nicaragua route and pays no attention to your claim for loss of property, loss of concessions, and damages—pays no attention to your company—do you expect to come before Congress at a later date to make any claim to be reimbursed for the money that you have expended?

Mr. ATKINS. I can not answer for the board of directors or the stockholders, categorically, any such question as that. I can only speak of what the attitude was in the past, and I assume that in the future it would be entirely consistent with what it was in the past.

Senator HANNA. Would the construction company have any claim against the Government?

Mr. ATKINS. The construction company has no claim whatever against the Government. The Maritime Canal Company is the only company that has any.

Senator HANNA. But the construction company holds the securities of the Maritime Canal Company?

Mr. ATKINS. Yes.

Senator HANNA. And they are not worth anything unless the Maritime Canal Company are responsible for them, and the Maritime Canal Company would not have any responsibility or ability to pay those securities unless they got something from the Government. So, indirectly, it seems to me that the construction company have an interest in this claim.

Mr. ATKINS. Indirectly, that is true.

Senator KITTREDGE. Has Costa Rica ever taken any steps to annul your franchise?

Mr. ATKINS. None whatever. Her attitude toward the company has always been very friendly.

Senator KITTREDGE. You have never been notified of any objection on her part?

Mr. ATKINS. No, sir.

Senator KITTREDGE. So as to that Government your concessions and franchises are clearly in force?

Mr. ATKINS. We believe so. We have never had any intimation to the contrary.

Senator KITTREDGE. And that concession appears in some of the records here?

Mr. ATKINS. Yes, sir.

Senator KITTREDGE. And you understand that that concession is an exclusive franchise, is it not?

Mr. ATKINS. Oh, yes; it is almost a verbatim copy of the Nicaragua concession.

Senator KITTREDGE. Have you any lands in Nicaragua besides the lands covered by the route of the canal?

Mr. ATKINS. No, sir. Well, the concession itself permits us to locate ascertain proportion of the lands at our will; that is, away from the route of the canal, but under agreement with the Government, as appears in the concession.

Senator KITTREDGE. I think in a former part of your testimony you mentioned alternate sections?

Mr. ATKINS. Yes; the grant along the canal line is in alternate sections.

Senator KITTREDGE. And to what distance to either side of the center line of the proposed canal do the alternate sections extend?

Mr. ATKINS. The concession states that.

Senator KITTREDGE. Do you regard the concessions from Costa Rica as valuable?

Mr. ATKINS. Most certainly. The canal can not be operated without that concession.

Senator KITTREDGE. And what do you consider them worth?

Mr. ATKINS. Well, the company considered the concessions so valuable as to agree to give a million and a half of its stock for that from Costa Rica.

Senator KITTREDGE. What do you say they are worth?

Mr. ATKINS. I should say further, it gave, beside the million and a half of its stock to the Government of Costa Rica, a proportion of \$12,000,000 of its stock to the construction company for it. I think it would be impossible to put any value upon such assets. Values are determined by the market, and I do not think that either of the concessions would be valuable against the will of the United States Government if the canal should be located there.

Senator KITTREDGE. Do you think the United States Government could go into Costa Rica and locate a canal and construct it in violation of your concessions, covering not only the route, but these additional tracts of land?

Mr. ATKINS. Perhaps I have not stated my reply to the previous question correctly. I doubt whether a canal through those countries could be constructed without granting rights to foreign powers which would be objectionable to the United States, and therefore I do not believe that the concessions granted by either Nicaragua or Costa Rica would have any value in the market without the consent of the United States.

Senator KITTREDGE. Suppose the United States takes this route, what then would you say in regard to the value of these concessions and in regard to your relations?

Mr. ATKINS. I think I have answered that in my statement of the attitude of the canal company toward the Government, when it was asked what we would relinquish our rights for.

Senator KITTREDGE. Is this amount included in your four or five million dollars?

Mr. ATKINS. Oh, yes, sir.

Senator MITCHELL. Suppose Costa Rica should grant the United States a concession, what then?

Mr. ATKINS. If Costa Rica should grant the United States a concession, it could only be done in violation of our rights. If the United States should accept the concession in violation of those rights, it would be, saying it with all respect, an unjust thing to the canal company. Of course I do not assume, and I do not think the company assumes, that the United States would do anything of that kind; and I have already said that at a time past the company had itself expressed its willingness to accept reimbursement of the money that it had expended, and if required by the United States, a willingness to relinquish its claims to what it had done. I have already stated that in your absence. I think that covers the attitude of the canal company toward the acquisition of any of these concessions or either of these concessions by the Government of the United States.

Senator HANNA. Then, speaking for the canal company, and expressing their sentiment in that regard, do you say that they do not expect that the Government will deal liberally with them and pay them something for their concessions?

Mr. ATKINS. Does your question as to that expectation mean such a one as would make the company obstructive?

Senator HANNA. No, that was not my question. You speak for the company, do you?

Mr. ATKINS. I do not, sir.

Senator HANNA. You speak for the company when you say that the spirit of the company would be to leave it to the United States as to whether they would give them anything or not. You have stated that.

Mr. ATKINS. I have stated that that was the spirit, and I believe it is still the spirit of the company.

Senator HANNA. Now, then, along that same line, as representing the company, do you not think the company would expect that the United States Government would pay them some reasonable compensation?

Mr. ATKINS. Well, naturally, I should think so.

Senator HANNA. You said you did not expect anything about it when you were asked the question before, and I wanted to see whether you meant that.

Mr. ATKINS. Pardon me, sir, if I explain myself. I do not expect it in the sense of desiring to urge it.

Senator HANNA. No, I do not ask the question in that spirit.

Mr. ATKINS. I thought the question was asked me in that way. I do not think the company has any disposition to urge its claims for any amount of money. I think it would naturally expect that a great Government, like that of the United States, would do something for its citizens who had taken care of a valuable privilege, such as the right to construct a canal across Central America, who had taken care of it for so many years at such a cost to themselves. We should naturally expect that something should be done.

Senator HANNA. That answers my question.

Mr. ATKINS. But not in the sense of making our desire obstructive in any way.

Senator KITTREDGE. Is it possible for the United States to construct a canal through Costa Rica, along the proposed route, without violating the concessions which Costa Rica has given you?

Mr. ATKINS. No, sir.

Senator KITTREDGE. In the event that the United States adopts this route, you expect to be indemnified, do you not?

Mr. ATKINS. Well, I have tried to answer that a good many times.

Senator KITTREDGE. I guess probably you have, and I will withdraw that. I wanted to get a square answer to that question.

Senator HANNA. The Construction Company would have some claim against the Maritime Canal Company if they received any pay from the United States Government, would they not?

Mr. ATKINS. Yes, sir. Whatever the Maritime Canal Company received, if it received anything, would be first claimed by the holders of the bonds of the Maritime Canal Company. If it was sufficient to liquidate the entire amount, why, then, any surplus would go to the stock of the Maritime Canal Company; but even the most liberal expectation would simply make a dividend on the bonds, and the bonds undoubtedly could be retired for such dividend as might be made. No one would consider them of any value except upon the basis of such a dividend, and the dividend could only be provided by a payment from the United States Government, for the Government is the only party to whom the route would be of any value.

Senator HANNA. Is the Construction Company a solvent concern?

Mr. ATKINS. Yes, sir.

Senator HANNA. Composed principally of stockholders in the canal company?

Mr. ATKINS. Well, I should think likely.

Senator HANNA. They would own the control?

Mr. ATKINS. The control of the canal company?

Senator HANNA. No; the control of the Construction Company.

Mr. ATKINS. The control of the Construction Company would be in the hands of the canal company.

Senator HANNA. Would be in the hands of the canal company?

Mr. ATKINS. Yes; that is so—that is, in the hands of stockholders of the canal company.

Senator HANNA. That is what I understood.

Mr. ATKINS. It always has been so.

The CHAIRMAN. Mr. Atkins, has your company, the Maritime Canal Company, ever applied to Congress for anything beyond a charter for the company?

Mr. ATKINS. No, sir.

The CHAIRMAN. Did it ever apply to Congress for any assistance whatever?

Mr. ATKINS. No, sir.

The CHAIRMAN. Was the proposition of Congress in reference to taking over the stock, or guaranteeing the bonds of the Maritime Canal Company, one that originated with Congress and not with the company?

Mr. ATKINS. It originated with the committee that had charge of that question.

The CHAIRMAN. The Committee on Foreign Relations?

Mr. ATKINS. The Committee on Foreign Relations.

The CHAIRMAN. The president and some of the directors of the Maritime Canal Company were called before the committee to ascertain whether or not they would consent for the Government to take over the stock in certain proportions for the guaranty of their bonds?

Mr. ATKINS. Yes.

The CHAIRMAN. And all of the legislation in Congress on the subject of the Maritime Canal Company was predicated upon that state of facts?

Mr. ATKINS. Yes; so far back as the time of Secretary Blaine, the canal company was urged to make application to the Government for its assistance on the ground that the canal should be a public work of the United States, and the answer made to Secretary Blaine was that we did not wish to make any such application. If the Government desired to acquire the control of the canal, we were ready and willing to consent that it should do so; that the canal should be a public work, but the company itself could not make any such application.

The CHAIRMAN. About what time did this effort on the part of these gentlemen in New York originate to get a concession from Nicaragua and Costa Rica?

Mr. ATKINS. I think it was some time in 1887 or 1886. I can give you the date, sir. The first meeting of the gentlemen to consider the question was in October, 1886.

The CHAIRMAN. That was a private meeting of private gentlemen, was it?

Mr. ATKINS. Yes.

The CHAIRMAN. It had no connection with this Government or any other government?

Mr. ATKINS. No connection whatever.

The CHAIRMAN. And they proposed to obtain a concession from Nicaragua for this property?

Mr. ATKINS. Yes; that was all that was considered necessary.

The CHAIRMAN. For these canal routes?

Mr. ATKINS. Yes.

The CHAIRMAN. Why was not Costa Rica included in that proposition at first, originally?

Mr. ATKINS. Because it was assumed that Nicaragua had the sovereignty over the San Juan River.

The CHAIRMAN. It afterwards turned out that, on the award of President Cleveland, Costa Rica had rights in that river with Nicaragua.

Mr. ATKINS. Yes; and that was the occasion of acquiring the concession from Costa Rica, and the obtaining of that concession from Costa Rica was another one of the occasions of disagreement with Nicaragua.

The CHAIRMAN. Nicaragua opposed it?

Mr. ATKINS. Nicaragua opposed it, and protested against it in the first meeting of our directors, and insisted for a long time that the acceptance of a concession from Costa Rica was a violation of the sovereignty of Nicaragua—an acknowledgment, rather, of the sovereignty of Costa Rica over a property which Nicaragua claimed was her territory.

The CHAIRMAN. And that was after the boundary line had been settled between Nicaragua and Costa Rica?

Mr. ATKINS. Yes.

The CHAIRMAN. She still protested?

Mr. ATKINS. Yes.

The CHAIRMAN. But that matter was settled between themselves, was it?

Mr. ATKINS. Well, I do not know, sir, what the final outcome of it was.

The CHAIRMAN. Were the delegates or the directors of each of these States admitted to your board?

Mr. ATKINS. They were, but the director representing Costa Rica withdrew from attending the sessions of the board, from a desire to have an adjustment of the boundary question on friendly terms. The representative of Nicaragua continued to attend our sessions until some trouble between the representative of Nicaragua, Mr. Guzman, and his Government occasioned his withdrawal as director; and since that time the right of their directorship is held in abeyance. The Nicaraguan Government notified the company that they would designate, at such time as they saw fit, their proper representative, and the vacancy has always been held open to them.

The CHAIRMAN. But during the period of your administration of the affairs of the Maritime Canal Company, both Nicaragua and Costa Rica had directors in the board?

Mr. ATKINS. Yes.

The CHAIRMAN. Who worked like other directors, voted and took full part in the meetings?

Mr. ATKINS. The director of Nicaragua did. The director of Costa Rica did not attend the sessions.

The CHAIRMAN. Not at all?

Mr. ATKINS. Not at all; not from the date that I speak of, the meeting of the first board.

The CHAIRMAN. Until Nicaragua withdrew her director, her director participated like other directors in all the management of the business?

Mr. ATKINS. Continually; and reported to the company the attitude of his Government toward the canal.

The CHAIRMAN. That director was Mr. Guzman, was he not?

Mr. ATKINS. Yes.

The CHAIRMAN. He was minister of Nicaragua to this Government?

Mr. ATKINS. Yes.

The CHAIRMAN. About how long did Mr. Guzman sit in the board; about how many years?

Mr. ATKINS. I can not tell exactly, but I should think until about 1892, possibly 1893. I can only find that by referring to the record. It was in 1896.

The CHAIRMAN. He sat there several years?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. Before your company was chartered by Congress was there a survey made for the benefit of the association?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. Who made that survey?

Mr. ATKINS. Mr. Menocal.

The CHAIRMAN. What was Mr. Menocal's relation to the Government of the United States at that time?

Mr. ATKINS. I think he was a civil engineer in Government employment and that he obtained a leave of absence to make that survey.

The CHAIRMAN. Our Government gave him leave of absence to make that survey?

Mr. ATKINS. That is what I understood.

The CHAIRMAN. For these associates?

Mr. ATKINS. Yes.

The CHAIRMAN. Then subsequently he made a survey for the Maritime Canal Company.

Mr. ATKINS. Yes. I think that was also under leave of absence.

The CHAIRMAN. I will read you that leave of absence and see if you remember it:

“MARCH 1, 1889.

“The leave is asked for to enable Mr. Menocal to act as chief engineer of the Nicaragua Canal. His services are really necessary to the undertaking, such has been his prominence in connection with it in the past. Otherwise I would not grant the request, but in view of the public importance of the enterprise to our country it is entirely fit to give any assistance in our power.

“W. C. WHITNEY.”

Mr. ATKINS. I recollect that as being substantially the leave of absence which he received.

The CHAIRMAN. Now, our Government, at that time, had the policy of executing the contract of these associates as a private company, without Government assistance, as I understand it.

Mr. ATKINS. Yes.

The CHAIRMAN. But that the matter was so important to the Government, in the execution of its policy, that Mr. Whitney gave this order to Mr. Menocal to go there.

Mr. ATKINS. Yes, sir.

The CHAIRMAN. During the time Mr. Menocal was serving that company as engineer did he receive any salary from the company?

Mr. ATKINS. He received a salary from the company, so far back as my recollection goes. What he received from the association before I became connected with the enterprise I do not know; but we paid him a salary in connection with the company always.

The CHAIRMAN. The policy of the Government at that time was then to construct the canal in conformity with the Clayton-Bulwer treaty, by private parties?

Mr. ATKINS. Yes.

The CHAIRMAN. That policy was afterwards changed?

Mr. ATKINS. Yes.

The CHAIRMAN. And the Government now has the policy of constructing the canal entirely by the Government, under Government resources and under Government control?

Mr. ATKINS. We have understood that ever since the first proposition was made to us to relinquish the enterprise to the Government.

The CHAIRMAN. You understood that was the object of the proposition that was made to you.

Mr. ATKINS. Yes.

The CHAIRMAN. To get the control of this canal in the hands of the Government of the United States?

Mr. ATKINS. Yes.

The CHAIRMAN. A change of the policy which was indicated by the previous Administration?

Mr. ATKINS. Yes.

The CHAIRMAN. The Administration of Mr. Cleveland?

Mr. ATKINS. Yes.

The CHAIRMAN. Has your company ever held any attitude toward the Government of the United States, since that policy was changed, in opposition to the Government obtaining full control of that route,

even at the expense of your charter and of your property, or whatever you have there?

Mr. ATKINS. Never, sir.

The CHAIRMAN. Never has?

Mr. ATKINS. No, sir.

The CHAIRMAN. Have you ever, in any other form than you have stated to-day, if you remember, signified to the Government of the United States your entire willingness that the Government should take over all of the benefits which you had under your concessions and use them for its advantage in any way that it thought proper?

Mr. ATKINS. I do not know of any other. There may have been some proposition of that kind made by others, but the only one that I have knowledge of was that made by Mr. Hitchcock. Whatever conference has been had between the officers of our company and the Representatives or committee of Congress has always been subject to that original condition that I have stated, that is, the willingness of the company to relinquish in favor of the United States.

The CHAIRMAN. And you are still willing to do it, although you may not think it just?

Mr. ATKINS. Entirely so. I have not any reason to suppose that the position of the board of directors has changed at all, and I think I should have known it if it had.

The CHAIRMAN. Have you been informed by the Government in any way, or has any intimation been made to you by the Government, that the protests you have filed asserting your rights under these concessions have been any disadvantage to the diplomatic action of the Government of the United States with Nicaragua and Costa Rica.

Mr. ATKINS. No, sir. On the contrary I think that the protests that we have made, so far as we have had any intimation at all, have strengthened the attitude of the United States with those two Governments, with regard more particularly to the canal question.

The CHAIRMAN. You have expressed the opinion here that if the Government of the United States should build a canal at Panama, that it still would be useful to the Government of the United States to hold on to these concessions and demand your rights?

Mr. ATKINS. I do most certainly believe so; that is, if the Government should undertake to build the canal at Panama, a thing which I can scarcely imagine.

The CHAIRMAN. Has not the Government of the United States at all times had the opportunity of making the assertion of your rights as against Costa Rica and Nicaragua for the purpose of excluding other governments and other powers from going in there and obtaining any concessions whatever?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. When, in December, 1900, protocols of agreement were made between the Government of the United States and the Governments of Costa Rica and Nicaragua, under which, with the approval of Congress, they conveyed to the Government of the United States exclusive rights to construct and maintain canals across their territory, did that lead to any protest on the part of your company, or were your company satisfied with it?

Mr. ATKINS. We were entirely satisfied with it, sir. In our opinion that was simply a strengthening of the position of the United States, and an endeavor to clear away any possible question that might be raised by those Governments outside of our concessions.

The CHAIRMAN. Have those gentlemen who put their money into this canal company made any money out of it?

Mr. ATKINS. No, sir. Some of them lost very heavily. Mr. Hitchcock, so far as I can judge, put in over \$400,000, which so far must be considered as lost.

The CHAIRMAN. Could he afford to make a loss of that kind?

Mr. ATKINS. No, sir; he could not. I could give name after name whose money was simply sunk. Directors and private stockholders put their money in, and I do not think 1 per cent of them did so with any other desire or with any other disposition than to stand by the enterprise and await the result at whatever cost should be necessary. There were, of course, a few stockholders, as there must be in every enterprise, who went into it for the purpose of speculation, and they, perhaps, sold out; but the large majority of them, quite 90 per cent, put their money in simply with a view to the result, and the money that they put in at first is there now.

The CHAIRMAN. You spoke of Mr. Hitchcock's investment of probably \$400,000.

Mr. ATKINS. I think he invested quite as much as that.

The CHAIRMAN. When he died he was a poor man, was he not?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. When he started into this enterprise he had a fine estate?

Mr. ATKINS. Yes; I think that before he started into this enterprise he was worth \$800,000 or \$900,000.

The CHAIRMAN. Did Mr. Hitchcock ever inform you of a communication he authorized me to make to the Senate, that in the event the Government of the United States found it in accordance with its policy to build the canal at Panama, in its own right or out of its own money, the Maritime Canal Company would make no objection, although it might cost them all that they had put into it?

Mr. ATKINS. I do not recollect his having spoken of that particular fact, but I know that was in entire consistency with all his statements and actions and with his attitude toward the Government always.

The CHAIRMAN. Mr. Hitchcock devoted a great deal of time to this work, did he not?

Mr. ATKINS. Oh, yes; a great deal more than he ought to have done. He was very enthusiastic about it. He was a man who, in his state of health and at his time of life, ought not to have taxed himself as he did with this enterprise.

The CHAIRMAN. He worked at it continually?

Mr. ATKINS. Yes.

The CHAIRMAN. And it was a very heavy matter to manage by the president of your company?

Mr. ATKINS. All of the diplomatic action of the company, all of its correspondence with Nicaragua, and all of the legal action that it was called upon to take at any time were directed and controlled by Mr. Hitchcock. I do not think I ever knew a man with greater diplomatic ability.

The CHAIRMAN. I agree with you. He was a man of great public spirit, was he not?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. Devoted to charity?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. If the Government of the United States should take

over these canal rights of Nicaragua and Costa Rica and construct the canal, have you any demands to make against the Government for your property that has been destroyed?

Mr. ATKINS. I do not think that there is any disposition of that kind in the mind of any member of the board of directors.

The CHAIRMAN. In this expenditure of this \$4,000,000 and upward was there any defalcation or any fraud or any want of economy?

Mr. ATKINS. No, sir.

The CHAIRMAN. Do you think that the work that was actually done there in making the plans and in building the railroad and equipping it, in dredging out the channel to the sea, and in making the surveys was worth the money that you paid for it?

Mr. ATKINS. Yes, sir.

Senator KITTREDGE. And in addition to that you issued stock to cover the concessions?

Mr. ATKINS. Oh, yes. The amount I speak of, the four and a half millions or thereabouts, was money actually expended in one way and another.

Senator KITTREDGE. In the actual work of constructing the canal?

Mr. ATKINS. In the actual work of constructing the canal, yes; and the administration of affairs, office rent, salaries, and things of that kind. It was all incidental to construction.

Senator KITTREDGE. The concessions you secured from Costa Rica and Nicaragua were in addition to that sum?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. How much did the association pay in money for the concession?

Mr. ATKINS. They paid \$100,000, I think.

The CHAIRMAN. And then afterwards \$50,000?

Mr. ATKINS. Afterward the Maritime Canal Company paid \$50,000.

Senator KITTREDGE. For these concessions you issued stock to the amount of over \$19,000,000?

Mr. ATKINS. No; we issued \$18,000,000, but \$1,500,000 to Costa Rica was not issued.

Senator KITTREDGE. That was the amount you would be willing to issue to Costa Rica?

Mr. ATKINS. That is a million and a half to Costa Rica.

Senator KITTREDGE. Which makes nineteen million and a half.

Mr. ATKINS. Nineteen million and a half. Now, please make a distinction there, sir. The stock that was issued to Nicaragua and Costa Rica, or rather issued and obligated to be issued—\$7,500,000—was the direct purchase money paid to those Governments. The \$12,000,000 was for the purchase of the concessions from the Construction Company.

Senator KITTREDGE. Through Mr. Menocal, as attorney in fact.

Mr. ATKINS. Mr. Menocal, the attorney in fact, acquired them and conveyed them to the Construction Company, and they were purchased by the Maritime Canal Company from the Construction Company.

The CHAIRMAN. The Construction Company was chartered in Colorado, was it not?

Mr. ATKINS. It was chartered in Colorado; yes, sir.

The CHAIRMAN. A separate corporation from the Maritime Canal Company entirely?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. Under a separate government?

Mr. ATKINS. Yes, sir.

Senator MITCHELL. In the event that the United States should construct a canal on the Nicaragua route, how far and to what extent could the work that was done by the Maritime Canal Company or the Construction Company be utilized?

Mr. ATKINS. Well, I think that it has been largely utilized at present, to such an extent as it could be. A large proportion of that money was spent in surveys. The Government has availed itself of that. I think somewhere between seven and eight hundred thousand dollars was spent in that way by the canal company.

Senator MITCHELL. That has all been utilized by the Government.

Mr. ATKINS. That has all been utilized by the Government. They have appropriated all that, and have found that our surveys were correct and good. Then some twelve miles of railroad were built. The Nicaragua Government has torn that up. We purchased a large equipment of dredging material that has now been superseded by improved and more efficient machinery.

The CHAIRMAN. You purchased machinery and the machinery has been superseded by later inventions?

Mr. ATKINS. The machinery of the dredges has been superseded by later inventions, and the dredges lay there in the lagoon, because of the obstruction of Nicaragua, and rotted and their machinery is really of no value now. Then we did some dredging, which went to demonstrate certain facts and conditions which are valuable, outside of the mere work that was done. So that a great deal of the work that was done there was a necessary expenditure, the value of which accrues, although the work itself to some extent has no present value.

The CHAIRMAN. Did you put up machine shops there?

Mr. ATKINS. Yes, we put up machine shops, and they were all in good condition and equipped thoroughly with good machinery. That was another one of the wrongs that we suffered from the Nicaraguan Government—

The CHAIRMAN. Did you put up a hospital?

Mr. ATKINS. We put up good hospitals and demonstrated the hospital methods there that were necessary and advantageous in the work.

The CHAIRMAN. Did you put up houses for operatives and workmen?

Mr. ATKINS. Yes; we put up houses for operatives and for the officials that might be there, called upon to superintend the work.

The CHAIRMAN. Did you put up storehouses?

Mr. ATKINS. We put up storehouses; yes, sir.

The CHAIRMAN. And then you dredged a channel out from the bay at Greytown Harbor to the sea?

Mr. ATKINS. Yes; we dredged that about 2 miles out, and we built a breakwater there to illustrate and demonstrate the method proposed for constructing the harbor.

The CHAIRMAN. What was the success of that work of dredging?

Mr. ATKINS. Well, the theory was that the breakwater should be built out a certain distance; I have forgotten now the exact distance; and we built it out about one-half that distance. The result was that on the northern side of the breakwater a channel was cut right into the lagoon by the natural action of the water, and a good deal of business went by that channel into the harbor, which previously had been closed for many years. The misfortune was that we were unable, from lack of means, to build the breakwater out to still deeper water.

The CHAIRMAN. About how much of the money that was expended by the Construction Company in Nicaragua was for plant and for this dredging.

Mr. ATKINS. I could not tell you, sir, without referring to the account.

The CHAIRMAN. Was it a considerable amount?

Mr. ATKINS. Yes; a very large amount.

The CHAIRMAN. Did you have quite enough there to go on with the construction of your canal until you had reached the San Carlos River?

Mr. ATKINS. Oh yes; we had machine shop and machinery entirely adequate to pushing the work right on to the Ochoa dam.

The CHAIRMAN. What was the real cause of the failure of that company?

Mr. ATKINS. Of the Construction Company?

The CHAIRMAN. No; I mean of your Maritime Canal Company.

Mr. ATKINS. Well, it can not be said that the Maritime Canal Company has ever failed.

The CHAIRMAN. I mean the failure to go on with the canal.

Mr. ATKINS. Well, without meaning to reflect at all upon the Government, it was the interference of the United States. In pretty much every negotiation that we made for money we ran up against the proposition, "Oh, well, if we take hold of this, and there is any profit in it, the Government will come in and take the canal off your hands under the charter."

The CHAIRMAN. You refer to the change of policy in the Government as indicated by the action of the Committee on Foreign Relations.

Mr. ATKINS. That and the provision in the charter that the Government could amend it as it pleased or take it away—that really was the reason of our failure to obtain funds for building the canal.

The CHAIRMAN. Had you any arrangements with any great commercial or banking house for the advancing of money upon your bond?

Mr. ATKINS. Nothing that was concluded. There were negotiations carried on up to that point, and that looked promising of results. There were people who said they would advance the money, that they would take hold of the thing and advance the money, but presently they came up against that proposition.

The CHAIRMAN. Who was the banker with whom you negotiated?

Mr. ATKINS. It was a firm on the corner of Wall and William street. I do not recall their name.

The CHAIRMAN. Barring Brothers.

Mr. ATKINS. No; they had relations with Barring Brothers. It was a German house whose name is familiar enough to me, but I can not recall it now. They were on the corner of Wall street and William street, in the Bank of America Building.

The CHAIRMAN. They were connected with the Barings?

Mr. ATKINS. They had relations with the Barings.

The CHAIRMAN. So that the Barings would have been the real backers of the enterprise if they had gone into it?

Mr. ATKINS. That is what we thought.

The CHAIRMAN. That was your understanding at the time?

Mr. ATKINS. Yes, sir.

The CHAIRMAN. Did the failure of the Baring Brothers in 1893 have any effect upon the prospect of getting your bonds on the market and selling them?

Mr. ATKINS. Their prospects were ended before then. This I can not verify, but it has been said to me by people who should know that the fact that they were not able to take hold of the Maritime Canal Company resulted in the Barings taking hold of the South American scheme, the Buenos Ayres scheme, in which they sunk so much money and which resulted in their failure; so that I have inferred that if we

had consummated our arrangements with them, there would have been no embarrassment of any kind; the thing would have been carried on to its result and they would never have gone into the Buenos Ayres scheme in which they failed.

The CHAIRMAN. So you think that when the Government of the United States came to the conclusion that it would undertake the construction of the canal on government account, that that was fatal to the prospects of any private company building the canal on that Isthmus.

Mr. ATKINS. It was, most certainly, sir. I have been in the banking business a great many years, and I know how bankers feel with regard to such things. They will not go into enterprises which they consider uncertain.

The CHAIRMAN. Does your company object or protest in any way against the United States using your concessions or whatever may remain of them, after the forfeiture of them by Nicaragua, for the purpose of conducting its diplomatic negotiations with Nicaragua?

Mr. ATKINS. No, sir; on the contrary we are very glad, indeed, to have them use them.

The CHAIRMAN. You are glad to be of service to the Government in that direction.

Mr. ATKINS. Yes sir.

STATEMENT

OF

CAPT. JACOB WILLIAM MILLER

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Friday, March 7, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Hanna, Mitchell, and Foster, of Louisiana.

Also Senators Millard and Kittredge, members of the committee.

Capt. Jacob William Miller appeared, and was duly sworn by the chairman.

STATEMENT OF CAPT. JACOB WILLIAM MILLER.

The CHAIRMAN. Captain, you were an officer in the Navy?

Captain MILLER. Yes; I was a lieutenant-commander.

The CHAIRMAN. Are you retired or did you resign?

Captain MILLER. I resigned, sir.

The CHAIRMAN. When did you resign?

Captain MILLER. In 1883.

The CHAIRMAN. How long were you in the Navy?

Captain MILLER. From 1863 to 1883, twenty years.

The CHAIRMAN. In what business are you now engaged?

Captain MILLER. I am in the steamship business in New York.

The CHAIRMAN. You have the control of a line of steamers there?

Captain MILLER. I have the control of the marine district of the New York, New Haven and Hartford Railroad, including the various Sound lines.

The CHAIRMAN. How many ships are under your control?

Captain MILLER. We have eighteen large vessels and about thirty or forty small ones, tugs, and so forth.

The CHAIRMAN. Were you ever at the Isthmus of Panama? Were you ever on the Pacific side of the Central American States while you were in the Navy?

Captain MILLER. Yes, sir; on both sides.

The CHAIRMAN. Under the orders of the Navy Department?

Captain MILLER. Yes, sir.

The CHAIRMAN. Under whose command were you then?

Captain MILLER. I was there at several different times. I was there originally in the ship *Minnesota* at Colon, from which port I left the ship and went over the Panama Railroad to Panama, and thence took a mail steamer to San Francisco.

The CHAIRMAN. In what year was that?

Captain MILLER. In the year 1868. A year or two afterwards, I was in the ship *Jamestown* in the bay of Panama.

The CHAIRMAN. Under whose command then?

Captain MILLER. Under the command of Captain Truxtun. That

was in 1870, I think. We lay in the bay of Panama then during the summer months, I think about three months.

The CHAIRMAN. Were you with the Lull expedition?

Captain MILLER. Yes, sir.

The CHAIRMAN. When was that?

Captain MILLER. That was in 1872. I can give you a description of that, if you would like.

The CHAIRMAN. I want to get these general facts down first. You having been called at the instance of Senator Hanna, I will now ask him to proceed with the questions that he wants to ask you.

Senator HANNA. Were you connected with the Maritime Canal Company?

Captain MILLER. As a stockholder, sir.

The CHAIRMAN. Were you connected with the construction company?

Captain MILLER. Yes.

The CHAIRMAN. I want to find out something about the securities of the construction company. Can you tell me what the capital stock was?

Captain MILLER. Twelve million dollars, sir; originally.

Senator HANNA. About how much of it was issued?

Captain MILLER. The whole amount, sir; I think. I have not the figures here now.

Senator HANNA. Was it all issued?

Captain MILLER. I think it was, sir.

Senator HANNA. And were there any bonds in addition to the stock?

Captain MILLER. An issue of collateral trust bonds was authorized, but only a few of them were issued.

Senator HANNA. This stock and those bonds were issued by the Maritime Canal Company to the construction company?

Captain MILLER. No, sir. The stock and bonds I have referred to were the securities of the Nicaragua Canal Construction Company. The Maritime Canal Company of Nicaragua, however, did issue stock and bonds to the construction company for work done under the construction contract.

Senator HANNA. And you do not remember exactly, then, how much?

Captain MILLER. I do not remember exactly how much, sir. I did not bring the figures with me.

Senator HANNA. Was there a receiver appointed for the construction company?

Captain MILLER. What was known as the Nicaragua Canal Construction Company went into the hands of a receiver.

Senator HANNA. And what did they do with their assets?

Captain MILLER. They turned them over to the receiver and they were purchased at the receiver's sale by the reorganization committee, which subsequently turned them over to the Nicaragua company, a new company created by special act of the legislature of Vermont.

Senator HANNA. What did they turn over to them—simply the stock and bonds, as well as the assets?

Captain MILLER. Everything was turned over to the new company to start afresh with, after paying the debts.

Senator HANNA. Did they retain any of the stock and bonds in their own hands after the receiver was appointed? I mean, did the receiver retain in his own hands any of this stock and bonds?

Captain MILLER. I think not, sir. It was all turned over and the new company started afresh.

Senator HANNA. Did you have any connection with the new company—the Nicaragua company.

Captain MILLER. Yes; I am president of that company now, but I was not at that time. The new company since I have been president has been in a dormant condition, waiting for developments. We have been doing nothing at all.

Senator HANNA. What were the assets that were turned over to you as the president of the new company from the receiver?

Captain MILLER. They were turned over before I was president.

Senator HANNA. Do you know what you have got in the shape of securities or property now?

Captain MILLER. Well, we have got all that was left from the old company.

Senator HANNA. What securities have you in your possession now as president of the company?

Captain MILLER. I think we have about \$20,000,000 securities in the stock and bonds of the Maritime Canal Company.

Senator HANNA. Of the original Maritime Canal Company?

Captain MILLER. It was turned over to the original construction company for work done.

Senator HANNA. By the receiver?

Captain MILLER. No; by the Maritime Canal Company.

Senator HANNA. Are those securities in the treasury of your company now?

Captain MILLER. Some of them were used for the purpose of borrowing money.

Senator HANNA. Are any of them hypothecated for loans?

Captain MILLER. Yes; there was a loan made two years ago on which the securities had to be hypothecated.

Senator HANNA. To whom was the loan made?

Captain MILLER. To certain gentlemen who advanced money to keep the company going.

Senator HANNA. Can you give me the names of the parties?

Captain MILLER. No, sir; I can not now from memory. I was one of them, I know.

Senator HANNA. Was it a bank or trust company; or was it individuals?

Captain MILLER. The money was loaned by individuals.

Senator HANNA. Are there any securities in the hands of any banks or trust companies that you know of?

Captain MILLER. This was loaned on a note, and I think the Continental Trust Company discounted the note, according to my recollection.

Senator HANNA. Do you remember the amount?

Captain MILLER. It was about \$20,000.

Senator HANNA. Is that the only loan?

Captain MILLER. Yes; I think that is the only loan of the new company. There were some loans in the old company. I was trying to think where the dividing line was.

Senator HANNA. Are any of the officers of the new company connected with the Continental Trust Company as officers, or stockholders?

Captain MILLER. Yes; I think one or two of them.

Senator HANNA. The trust company still holds that note?

Captain MILLER. Yes; I think it does.

Senator HANNA. Can you give me the names of any of the stockholders of your company who hold any large amounts of the stock?

Captain MILLER. Of the Maritime Company, or of our company?

Senator HANNA. Of the company that is now in possession of the assets and rights of the Maritime Company, whatever they are.

Captain MILLER. May I ask a question?

Senator HANNA. Yes.

Captain MILLER. The Marine Company of Nicaragua is the company which the Government is dealing with? Our company was simply a construction company.

Senator HANNA. Yes.

Captain MILLER. And it went into the hands of a receiver, and in order to keep it going we reorganized, and some of us advanced some money to keep the thing going; and in advancing that, some of the officers of the Continental Trust Company, which had some of the securities, subscribed quite liberally for this loan in this \$20,000 that I told you about, which was put up to keep the company going. It was at a time when we had little or nothing.

Senator HANNA. Was there ever any assessment made upon the stockholders of the old company?

Captain MILLER. Oh, yes, sir; in the reorganization.

Senator HANNA. Do you remember how much that was?

Captain MILLER. About 50 per cent. The stock was reduced 50 per cent. That was in the old company. I could not say positively, but I think there was about 10 per cent, and then the stock was reduced.

Senator HANNA. And those who paid their assessments continued in the new company?

Captain MILLER. Yes.

Senator HANNA. And the others were dropped?

Captain MILLER. Well, the stock remains. They have never taken it up. The time limit has gone by.

Senator HANNA. They would not have any claims upon the assets of the company?

Captain MILLER. No, sir.

Senator HANNA. Has there ever been any action on the part of those stockholders antagonistic to the course taken by the new company?

Captain MILLER. No, sir.

Senator HANNA. In the courts or otherwise?

Captain MILLER. No, sir.

Senator HANNA. They never objected formally to any process of reorganization?

Captain MILLER. No, sir.

Senator HANNA. To your knowledge have they ever made any application to the United States Government for redress?

Captain MILLER. No, sir.

Senator HANNA. The Maritime Company with which you say the Government has to deal still claims, as I understand, the validity of its concessions from Costa Rica and Nicaragua?

Captain MILLER. Yes; they have done that as a matter of form, of course. They assume that the concession is still valid, because Nicaragua, for various reasons, did not go through the legal forms of annulling the concessions. I think it is article 14 of the concession that states exactly how it shall be done, and on account of revolutions and delays on the part of Nicaragua, and on account of the fact that they did not go through the regular forms to annul the concessions, we made a protest, I think, through the Government of the United States about two years ago.

The CHAIRMAN. I wish you would repeat that statement.

Captain MILLER. I say, on account of the terms of the concession not having been fulfilled by Nicaragua, as to the manner that the concessions should be forfeited, and also on account of the revolutions by

which we were delayed down there, and for various minor reasons, the Maritime Company made a formal protest.

Senator HANNA. You made that through the Department of State?

Captain MILLER. Through the Department of the Interior, to which the Maritime Company makes its annual report.

The CHAIRMAN. How do you know anything about this? What is the source of your knowledge on that point?

Captain MILLER. I simply know from hearsay. Somebody told me that it had been made, and I think it was in the public prints and in the report of the Secretary of the Interior, which I think I remember seeing.

Senator HANNA. Yes; I think that is a fact. I think it is in the report of the Secretary of the Interior. Then you consider the action of the Department as an official recognition that the canal company still holds onto its rights?

Captain MILLER. With limitations, yes, sir. I think in addition to that, if I remember correctly, that the president of the Maritime Company, Mr. Hitchcock, before he died, wrote a letter to the Secretary of the Interior, stating that the Maritime Company was willing to accept anything proper in equity, in the building of the Nicaragua Canal, that the Government should see fit to give. My recollection is that such a letter was written. Personally, I should say for myself that, as a stockholder of the Maritime Company, the main point is to have the Nicaragua Canal built. And I think I speak for a great many when I say that we have written off the value of our stock with the understanding that, if the canal, which we have been working for for so many years, can only be built, whatever value our stock may have should not be considered necessarily, if it interfered with the building of what we consider the proper canal. I know I feel that way.

Senator HANNA. Do you mean by that that there would be no claims on the part of the Maritime Canal Company or the construction company against the Government, if it should undertake to finish the canal?

Captain MILLER. Well, not beyond what we consider the Government owes us in equity.

Senator HANNA. And how much is that?

Captain MILLER. I think the claim was \$5,000,000, the money we have actually expended.

Senator HANNA. And you still consider that a valid claim?

Captain MILLER. I think it is valid to the extent of justice and equity for money actually expended in keeping before the American people for eighteen years what we consider the American canal.

Senator HANNA. Your company would be inclined to enforce that equity by process of law or otherwise, if they consider it justly due them, would they not?

The CHAIRMAN. Which company do you speak of?

Senator HANNA. The Maritime Canal Company.

Captain MILLER. I can not speak for that company, except as a stockholder.

Senator HANNA. You say you have a claim in equity against the United States Government of about \$5,000,000. Who owns that equity?

Captain MILLER. The Maritime Canal Company.

Senator HANNA. The Maritime Canal Company?

Captain MILLER. I should think it did.

Senator HANNA. And as a stockholder of that company you believe

that the company would seek to enforce its claim that you think is just?

Captain MILLER. I think that it has a just claim, yes, sir.

Senator HANNA. Well, what is your judgment about collecting it?

Captain MILLER. I think if it jeopardized the building of the canal in any way, we would be willing to let it go, because the whole desire of the Maritime Canal Company and ourselves has been to build that canal, at any cost either to ourselves or to the country, provided the proper canal is built.

Senator HANNA. That is hardly a direct answer. I should like to know what, in your judgment, would be the action of your company against the United States Government for this equity in case the United States Government should build this canal.

The CHAIRMAN. By "your company" you mean the Maritime Company?

Senator HANNA. I mean whichever company owns these equities. I suppose it is the Maritime Canal Company.

Captain MILLER. The Maritime Canal Company, sir. Of course I can not answer for that. Our company could not make any claim. The Maritime Canal Company is the only company that could make it.

Senator HANNA. Who are the officers of the Maritime Canal Company?

Captain MILLER. Judge Henry E. Howland is the president, and Mr. Thomas Atkins is secretary.

I should like to make a statement, Senator, with perfect frankness, if you will permit me, as to the attitude of the gentlemen who have labored for Nicaragua, so far as I am acquainted with them, if you will allow me to do so.

Senator HANNA. Certainly.

Captain MILLER. From the year 1872, I have been interested in this canal problem, having been a Government officer on the survey. In 1886 a small party of us tried to interest other persons. We organized an association from which developed the Maritime Canal Company, and the construction company to build the canal.

We were all enthusiastic, and we had at that time an idea that we would make a great deal of money. We continued to work and got a thousand people interested in the project. We kept at the good work, as we considered it, and sent a surveying party down there under the Nicaragua Canal Construction Company, consisting of 1,800 men at one time, and as high as 2,000 men at one special time. All this is of record. Up to that time we imagined that the canal would be built at once; but all sorts and conditions of things came up to prevent it, which are matters of history.

We kept the canal project before the country against certain people at home and enemies abroad, and from the French at one time.

After the panic of 1893 I think most of us ceased to have any idea of making any money out of the thing, and we kept at it from patriotic motives from that time to this. We have always been ready to work with the Government, and have done so.

Two years ago, we were asked specially not to do anything in Nicaragua, because the question was coming up directly with the Government.

Senator HANNA. By whom was that request made?

Captain MILLER. It was made by the Secretary of the Interior, I think. Whether it was official or not I am not quite prepared to state. At all events it was at the time that Mr. Grace and his associates endeavored to obtain concessions, and, in our opinion, hurt the Nica-

ragua project very much, and disturbed the relationship between the Government and our company. This was just before the alleged revocation of our concession.

We still kept our pledges and would not unite with the Grace party. We stated before the Congress at that time, and I think the letter is on file in this committee, that we were ready as individuals and as a company to do what the Government wished. Mr. Hitchcock, who was then president of the Maritime Canal Company, after a meeting of the directors, stated, I think, in a letter which is on file in this committee, and also in a letter to the Secretary of the Interior, that he was ready to accept anything that the Government might in justice think due, but that he did hold that the gentlemen who had done so much to keep this project before the American people ought to be reimbursed for the money they had spent in the explorations, the surveys, the maps, the building of the breakwater, the buying of the dredges, and the keeping the project alive before the country, and for the country, from 1886 until 1900.

As a matter of fact, the Government owes us some \$15,000 for work to start the Ludlow Commission. That is, it owes the Maritime Canal Company for cash expended on the Ludlow Commission.

We have been a body of American citizens who, patriotically and sentimentally, and perhaps foolishly, with some idea of financial reward at one time, but with none now further than to get back the money we have put into it, have kept the Nicaragua problem before the country for many years. Personally, rather than see anything interfere with the Nicaragua Canal, which I have surveyed and know all about (knowing something also about the Panama Canal), I should be willing to forfeit my stock, or any money that I have invested, provided it is to the interest of our country to do so, and I think most of our people feel as I do.

Senator KITTREDGE. How much money has been expended?

Captain MILLER. Between \$4,000,000 and \$5,000,000 in a period of eighteen years. It is reported to the Secretary of the Interior every year.

Senator HANNA. In that expenditure have you purchased any land along the route of the canal?

Captain MILLER. The Maritime Canal Company purchased land on the west side. I do not remember the exact amount. I remember they did purchase land.

Senator HANNA. Do they still own it?

Captain MILLER. Well, I should say they did. Of course, I suppose Nicaragua says they do not.

The CHAIRMAN. Let me ask you just there, was the purchase made from private individuals or from the Government?

Captain MILLER. I think it was mostly from the Government, or the Government promised to obtain it.

The CHAIRMAN. The Government of Nicaragua?

Captain MILLER. At any rate the Government stood back of it.

Senator HANNA. You have not abandoned any rights or titles that you ever had to that land?

Captain MILLER. From our point of view we have not, nor do I think it would be advisable for us, in the interest of the Government of the United States, to do so.

Senator HANNA. You expect to be reimbursed for that, of course, if the canal is built?

Captain MILLER. The amount for the land is included in the general

claim. I think the whole thing hinges on the action of the Government of the United States. We are absolutely in the hands of the Government as regards any reimbursement whatever. That is the way I feel personally about it.

Senator HANNA. Your personal feelings might not actuate the officers of the corporation. You only speak for yourself. Do you know whether or not the Maritime Canal Company have ever expressed themselves by any action of their board with reference to their properties and concessions there? Have they ever made any demand upon the Nicaraguan Government?

Captain MILLER. Oh, yes; I believe they have.

Senator HANNA. What reply did the Nicaraguan Government make to that demand?

Captain MILLER. I have not seen the text of it, but I know from the officers of the Maritime Canal Company that they said the concession had expired.

Senator HANNA. That the Government of Nicaragua said so?

Captain MILLER. Yes.

Senator HANNA. And with reference to the title to the land, did they claim that that was forfeited also?

Captain MILLER. I do not know.

Senator KITTREDGE. Do you know where this land is located, with reference to the route of the proposed canal?

Captain MILLER. It was somewhere between Brito, on the western side, and the lake, I think.

Senator KITTREDGE. Where with reference to the line of the canal as proposed?

Captain MILLER. Oh, I think right along the line of the canal. The object was to buy it so as to control it. Of course, I am speaking only from the conversations that I have had with the officers of the Maritime Canal Company in regard to this land.

Senator HANNA. You can not speak from your own knowledge of the proposed action of the Maritime Canal Company. You only speak for the construction company.

Captain MILLER. Except as to what is printed and of record here.

Senator HANNA. Did the Maritime Canal Company have a concession from Costa Rica, too.

Captain MILLER. Yes.

Senator HANNA. Is that in the same position as the other? Have they given notice of forfeiture?

Captain MILLER. No; but I think, if I remember correctly, that that ran for two years longer.

Senator HANNA. Have they given you notice of forfeiture?

Captain MILLER. I think not.

Senator HANNA. Never have?

Captain MILLER. Mr. Atkins can tell that.

Senator HANNA. What is your idea about the value of your equity in those concessions? Have you any fixed sum in your mind as to what you consider the value?

Captain MILLER. I have personally a very strong opinion of the value.

Senator HANNA. I should like to have your personal opinion.

Captain MILLER. Why, that the men who put the money into this great project ought to get it back with proper interest.

Senator HANNA. You did not pay anything for the concessions, did you?

Captain MILLER. Yes; it is all included. We paid a large sum for the concessions.

Senator HANNA. Do you remember just how much?

Captain MILLER. I can not remember now, sir; but we paid a large sum for the concessions and for the land. It is all of record in the Interior Department, exactly what was paid.

Senator HANNA. If it is of record, we can get it.

Captain MILLER. I do not know how far you wish me to go into details, but there has been a report made every year by the Maritime Company to the Interior Department that is published. Is not that true?

The CHAIRMAN. Yes; a sworn report by Mr. Hitchcock.

Captain MILLER. A sworn report, showing what was expended by the company.

Senator HANNA. If these concessions from Nicaragua and Costa Rica are still in force, as you claim, are they exclusive concessions?

Captain MILLER. Yes.

Senator HANNA. Absolutely?

Captain MILLER. As I remember. I do not want to be too positive on these Maritime Canal Company questions.

The CHAIRMAN. Those concessions are printed in the reports of the committee, already before the Senate two or three times.

Captain MILLER. I know that the officers of the Maritime Company especially thought it necessary to hold those concessions, and, if I mistake not, under the advice of our Government officers, so that no one else should get in there, and to make their protest strong, so that the United States, either through the company or through itself, if it took hold of the Maritime Company's property, should have something there.

Senator HANNA. Who was the engineer of the Maritime Canal Company?

Captain MILLER. Mr. Menocal at one time.

Senator HANNA. Was he an officer in the company?

Captain MILLER. No, sir; except as an engineer.

Senator HANNA. He had no official position except

Captain MILLER. No, sir.

Senator HANNA. Was he a stockholder?

Captain MILLER. I cannot say positively. He might have been a director of the Maritime Canal Company.

The CHAIRMAN. No; he never was a director.

Captain MILLER. I do not know whether he was or not.

The CHAIRMAN. No.

Senator HANNA. You say Mr. Hitchcock was the president of the company?

Captain MILLER. Of the Maritime Company; yes, sir.

Senator HANNA. Do you know who was their attorney?

Captain MILLER. Daly, Hoyt and Mason were the attorneys.

Senator HANNA. Are they still their attorneys?

Captain MILLER. I do not know, sir. There has been little or nothing done lately.

Senator HANNA. Now, with reference to the information you have in regard to the two routes, you say you have been over both routes?

Captain MILLER. I have been very thoroughly over the Nicaragua route, and I have been over the Panama Railroad two or three times. I have been at Panama for some months and at Aspinwall for some weeks.

Senator HANNA. And your knowledge of the two routes would enable you to give an opinion as to which was the best route for the Government to adopt?

Captain MILLER. I think so.

Senator HANNA. Which would you consider the best route?

Captain MILLER. I think there is no question that the Nicaragua route is the only route across the Isthmus for the people of the United States of America.

Senator HANNA. Why is it the only route?

Captain MILLER. Because I think it is the only route that fulfills all the conditions which America should have in an isthmian canal.

Senator HANNA. Do you form your conclusions from your own experience?

Captain MILLER. I do.

Senator HANNA. As an engineer?

Captain MILLER. I can not call myself an engineer, sir, although I have had some experience in engineering. I say it from what little knowledge I have of engineering and from a long study of the subject, and as a business man and as a seafaring man.

Senator HANNA. You have no connection with the Maritime Canal Company, and have not had except as a stockholder?

Captain MILLER. That is all, sir.

Senator HANNA. You do not know, therefore, officially, the situation of its business?

Captain MILLER. I do not.

The CHAIRMAN. I have here a copy of the latest protest filed by Hiram Hitchcock as president of the Maritime Canal Company to the Secretary of State, in which he sets forth the claims of this company as against the Government of Nicaragua. Do you know of any other statement that the company has officially made except the protest that has been filed with the Secretary of State?

Captain MILLER. Do I know what, Senator?

The CHAIRMAN. Do you know of any other protest that would reach Nicaragua, that has been officially made by the Maritime Canal Company, except the one that I have here, protest filed with the Secretary of State? Is there any other protest?

Captain MILLER. None that I know of, sir.

The CHAIRMAN. Then this gives the situation of the claim of the Maritime Canal Company as against the Government of Nicaragua?

Captain MILLER. As far as I know; yes, sir.

The CHAIRMAN. I will insert that in the record.

The matter referred to is as follows:

OFFICE MARITIME CANAL COMPANY OF NICARAGUA,
54 Broad Street, New York.

SIR: The Maritime Canal Company of Nicaragua, chartered by act of Congress approved February 20, 1889, and owner of the exclusive privilege granted by the Republic of Nicaragua to A. G. Menocal on April 24, 1887, known as the Cardenas-Menocal concession, to excavate and operate a maritime canal across the territory of said Republic between the Atlantic and Pacific oceans, hereby renews and in all respects confirms the two protests dated December 2, 1898, and September 8, 1899, respectively, heretofore filed by the company in the Department of State, and hereby presents to the Government of the United States its further protest against the more recent arbitrary and unlawful acts of the Republic of Nicaragua affecting the property and vested rights

of said Maritime Canal Company of Nicaragua. The wrongs done to the said company and the grounds for protesting against the same are as follows:

First. In September, 1899, a copy of the protest of the Maritime Canal Company, dated September 2, 1899, and hereinbefore referred to, was forwarded by the Department of State to the minister of the United States accredited to Nicaragua, with instructions to communicate the same to the Government of Nicaragua with an expression of the hope and expectation of the Government of the United States that the Maritime Canal Company would be heard in defense of its claim.

Said protest contained, among other things, a demand that the questions raised, as therein set forth, in regard to the proper interpretation of the stipulations of articles 4, 5, and 48 of the Cardenas-Menocal concession of April 24, 1887, should be referred to and determined by the court of arbitration provided for in article 55 of said concession. On September 18, 1899, a protest was also lodged with the minister of fomento of Nicaragua by the Maritime Canal Company, through its general agent residing in Managua.

Second. Article 55 of the said Cardenas-Menocal concession provides as follows:

"All misunderstandings that may arise between the State of Nicaragua and the company in regard to the interpretation of the present stipulations shall be submitted to a court of arbitrators composed of four members, two of which shall be named by the State and two by the company."

"These arbitrators shall be designated by each of the parties within the period of four months from the day on which one of the contracting parties shall have informed the other in writing of the want of agreement on the point at issue. Should one of the parties allow the aforesaid term to pass, it shall be considered as assenting to the opinion or claim of the other."

"The majority of the votes of the arbitrators shall decide finally and without recourse. In case of a tie vote, the arbitrators shall select, by mutual consent, a fifth person, who shall decide. If unable to agree to such nomination, they shall draw by lot the names of the diplomatic representatives accredited to Nicaragua, and the first one drawn out shall exercise the functions of the fifth arbitrator. He shall either adopt the opinion of one or the other of the parties to the controversy, or render his opinion between these extremes, and his decision shall be final and without any appeal whatever. The fifth arbitrator failing, the second person drawn shall exercise these functions, and so on successively until a decision is reached."

"Prior to the initiation of the work of opening the canal the Government shall formulate, with the concurrence of the company, regulations in which shall be prescribed rules to be observed by the arbitrators in all matters relating to procedure."

"Questions between the company and individuals residing in Nicaragua shall be under the jurisdiction of the ordinary tribunals of Nicaragua, in conformity with the legislation of the country. In matters pertaining to nonresidents of Nicaragua the rules of international private law will be observed."

Third. A misunderstanding having arisen between the State of Nicaragua and the Maritime Canal Company in regard to the interpretation of the stipulations of the concession contained in articles 4, 5, and 48 thereof, the company, in compliance with the provisions of said article 55, informed the Government of Nicaragua in writing on October

7, 1899, of the want of agreement on the point at issue by delivering to the minister of fomento on said date, by its general agent in Managua, the following written notification:

“MANAGUA, NICARAGUA, *October 5, 1899.*

“SIR: The contract entered into between the Government of Nicaragua and Messrs. Edward Eyre and Edward F. Cragin on October 31, 1898, contains a promise to grant to the Interoceanic Canal Company, a corporation to be formed as therein provided, the exclusive right in perpetuity for the construction of an interoceanic canal, after a recision of the Cardenas-Menocal concession shall be obtained, or after it shall cease to have legal existence. Article 41 of the said Eyre-Cragin contract provides that the Cardenas-Menocal concession shall cease to have legal existence on the 9th day of October, 1899, and that all the stipulations in said Eyre-Cragin contract specified shall take effect without necessity of further action, declaration, or law on the 10th day of October, 1899.

“It appears from the above that the Government of Nicaragua is of the opinion that by virtue of the provisions of article 48 of the Cardenas-Menocal concession it has the right to declare said contract terminated at the expiration of the term of ten years therein specified; whereas the Maritime Canal Company of Nicaragua, owner of the said concession, claims and insists that in consideration of the capital the company has invested in the enterprise and of the good will and ability it has shown and the difficulties encountered it is entitled under said article 48 to an extension of the said period of ten years within which the work of construction was to be completed. The company further claims that in view of article 4 of the Cardenas-Menocal concession, which provides that the exclusive privilege therein granted shall be for the duration of ninety-nine years, and article 5, by which Nicaragua binds itself not to make any subsequent concession for the opening of a canal between the two oceans during the term of said Cardenas-Menocal concession, the Republic of Nicaragua had no right or authority to grant to Messrs. Eyre and Cragin the agreement of October 31, 1898, and that, as against the Maritime Canal Company of Nicaragua, said agreement can be of no force and effect.

“It is evident, therefore, that a misunderstanding has arisen between the State of Nicaragua and the company in regard to the interpretation of the stipulations contained in articles 4, 5, and 48 of said Cardenas-Menocal concession, and the Maritime Canal Company of Nicaragua therefore demands that the said misunderstanding shall be submitted to a court of arbitrators, to be appointed as provided for in article 55 of said concession.

“It therefore becomes my duty to notify the Government of Nicaragua of the want of agreement existing between the Republic and the company as to the above questions and that the company elects to have the issues thus raised submitted to and determined by the court of arbitrators provided for in article 55.

“I have the honor to remain, sir,

“Yours, very respectfully.

“RUDOLF WIESER,

“*General Agent Maritime Canal Company of Nicaragua.*

“Hon. LEOPOLDO RAMIREZ M.,

“*Minister of Fomento, Managua, Nicaragua.*”

The above notice in writing having been served, as aforesaid, the Maritime Canal Company thereupon designated Hon. William L. Merry and Mr. Rudolf Wieser as the two arbitrators to be appointed by the

company, and on October 13, 1899, the President of Nicaragua and the minister of fomento were duly notified of such designation and appointment.

Fourth. On the 4th of November, 1899, the minister of fomento sent a written reply to the company's notification of October 5, 1899, in which he stated, among things, that the Government of Nicaragua, for reasons which it did not choose to mention, did not admit the right of the Maritime Canal Company to an extension of the concession, as claimed by the company, and did not consider it a point for arbitration; but that the Government, being certain of the justice of its position, consented to name its arbitrators, and would communicate to the company at a later date the names of the persons designated for that purpose. The minister also stated in this communication that the Government of Nicaragua refused to accept as arbitrators the persons named by the company on the ground that they were not citizens of Nicaragua, and on the further ground that Mr. Wieser was the representative of the company and that Mr. Merry was ineligible, as he was one of the diplomatic representatives who might be drawn under article 55 as the fifth arbitrator. The Government, therefore, notified the company that it must designate two other persons.

In reply to this communication the general agent of the company notified the minister of fomento on November 6, 1899, in writing, that under article 55 of the concession neither the Government of Nicaragua nor the company is restricted in the selection of arbitrators and that each has unlimited right to appoint as such arbitrators whoever it may choose without regard to their nationality. About the same time the State Department at Washington was notified of the refusal of the Government of Nicaragua to accept the arbitrators named by the company and of the grounds upon which such refusal was based.

The President of the United States in his message to the Fifty-sixth Congress made the following reference to the Cardenas-Menocal concession:

"The contract of the Maritime Canal Company of Nicaragua was declared forfeited by the Nicaraguan Government on the 10th of October, on the ground of nonfulfillment within the ten years' term stipulated in the contract. The Maritime Canal Company has lodged a protest against this action, alleging rights in the premises which appear worthy of consideration. This Government expects that Nicaragua will afford the protestants a full and fair hearing *upon the merits of the case.*"

On November 29, 1899, the United States minister accredited to Nicaragua wrote to the president of the company, stating, among other things, as follows:

"There is not even a pretense of a right to demand an exclusively Nicaraguan board; it is a requirement unfair and without precedent."

Fifth. Thereafter, and on or about the 28th day of December, 1899, the Secretary of State of the United States sent to the United States minister accredited to Nicaragua the following letter of instructions, a copy of which was at the same time forwarded to the president of the company for his information:

"DEPARTMENT OF STATE,

"Washington, December 28, 1899.

"SIR: I have to acknowledge the receipt of your despatch No. 349 of the 29th ultimo, inclosing a copy of a note to you from the Nicaraguan minister of foreign affairs, in which he admits the right of the Maritime Canal Company of Nicaragua to demand the arbitration of

the differences between his Government and the company but imposes the condition that all four of the arbitrators provided for by article 55 of the concession must be Nicaraguan citizens.

"Article 55 of the concession of the Nicaraguan Government to the Maritime Canal Company stipulates as follows:

"Any misunderstanding that may arise between the State of Nicaragua and the company in regard to the interpretation of the present stipulations shall be submitted to a court of arbitrators composed of four members, two of whom shall be appointed by the State and two by the company."

"On the facts represented to the Department, it appears to the Government of the United States that the Maritime Canal Company is clearly entitled to demand the submission to arbitration of the question of its rights and the alleged forfeiture thereof, involving the interpretation of the various articles of the concession in dispute. It seems equally clear that in the selection of the arbitrators the company has the right to choose freely two of the arbitrators and the Nicaraguan Government has an equal right to select two of them, and that neither party to the concession has or can have any right to impose any restrictions or conditions upon the selection to be made by the other; and that the refusal of the Nicaraguan Government to make the submission except upon its own terms and conditions in the selection of the arbitrators would be a manifest breach of the contract.

"You will therefore use your good offices in support of the demand of the company for arbitration, and of its claim of right freely to select two of the arbitrators, regardless of the condition imposed by the Nicaraguan Government that the arbitrators must all be citizens of Nicaragua.

"I am, sir, your obedient servant,

"JOHN HAY.

"WILLIAM L. MERRY, Esq.,

"*San Jose, Costa Rica.*"

Sixth. On the 23d of January, 1900, the following decree was issued by the President of Nicaragua, and transmitted on the same date to the general agent of the company in Managua, viz:

"The President of the Republic, bearing in mind that the representative of the Maritime Canal Company, Mr. Rudolph Wieser, under date of October 5, a. p., informed the Government of the interpretation which it gives to articles 4, 5, and 48, of the Cardenas-Menocal contract and of its intention to ask for a prolongation. Considering that this interpretation is unjust, as well as the solicitude for an extension, the Government disregards both; and in this case arbitration will have to be carried into effect and verified by the appointment of the proper persons as arbitrators within the term of four months, counting from the date of the note of advice of the said representative of the Maritime Canal Company, in the use of his faculties, decrees:

"First. Appoint Messrs. Jose Dolores Rodriguez and Dr. Bruno H. Buitrago, arbitrators on the part of the Government, to inquire and resolve, together with those legally appointed by the Maritime Canal Company or its representative, in regard to the interpretation and extension of the said company claims.

"Second. The attorney-general will take the necessary steps in conformity with the laws of the Republic.

"Communicate. Managua, January 23, 1900.

"ZELAYA.

"BERMUDEZ,

"*The Acting Minister of Public Works.*"

Seventh. Thereafter, and on January 31, 1900, the company withdrew the designation of the Hon. William L. Merry as one of the arbitrators appointed by the company, and designated Messrs. Aniceto G. Menocal and Rudolf Weiser as the company's appointees. This change was communicated to the Government within the four months' period specified in article 55, by the following letter:

"MANAGUA, NICARAGUA, *January 31, 1900.*

"SIR: I have the honor of notifying you that the Maritime Canal Company of Nicaragua has appointed Mr. Aniceto G. Menocal and myself as arbitrators, the former to replace the Hon. Mr. Merry.

"As I have not received an acknowledgment of my letter to you dated November 6, 1899, I take the liberty of inclosing a copy of the same.

"Further, permit me to remark, that the refusal of the Nicaraguan Government to arbitrate except upon its own terms and conditions in the selection of the arbitrators would be a manifest breach of the contract.

"Very respectfully, yours,

"RUDOLF WIESEB,

"General Agent Maritime Canal Company of Nicaragua.

"Hon. Dr. LEOPOLDE RAMIREZ,

"Minister of Public Works."

Eighth. On February 1, 1900, notwithstanding the fact that the Maritime Canal Company had in all respects fully complied with the provisions of article 55 of the concession under which the Government of Nicaragua had agreed to arbitrate the questions at issue with the company, the said Government, in disregard and direct contravention of the terms of said article, instituted proceedings in the local courts of the Republic to compel the company to appoint citizens of Nicaragua as its arbitrators. The judge of the second district court called upon the general agent of the company in Managua with documents providing for a method of arbitration not consistent with the provisions of article 55, which documents he requested the said agent to sign. Upon the latter's refusal to execute these papers the said judge cited him to appear before him in court within a period of three days. On the 3d day of February, 1900, being the last day of grace, the general agent of the company appeared before the said judge, stated he was there under protest, and refused to recognize the validity of the proceedings or to sign the documents submitted to him, for the reason that they prescribed a method of arbitration inconsistent with the provisions of article 55 of the concession and in violation of the rights of the Maritime Canal Company under said concession. The general agent of the company immediately thereafter filed his protest with the United States consul at Managua against the unjust action of the Government of Nicaragua in summoning him before the said judge of the district court and appealed to said consul in his official capacity for protection for the Maritime Canal Company.

Ninth. The company having declined to acquiesce in an arbitration to be conducted through the local courts in violation of the provisions of article 55, the judge of the second district court issued a decree declaring the concession forfeited on account of the alleged failure of the company to appoint arbitrators within the period of four months, as provided for by article 55 of the concession, thereby completely ignoring and refusing to recognize the designation of Messrs. Aniceto G. Menocal

and Rudolf Wieser, duly made by the company on January 31, 1900, as hereinbefore stated. On February 26, 1900, the company filed its protest against this decree of forfeiture and against the unjust action of Nicaragua in taking the matter before the local tribunals, but said protest was rejected by the Government of Nicaragua.

The company is advised that this adverse action of the Government of Nicaragua was taken after the receipt from its representative in Washington of a dispatch stating that the United States Government, having given the subject of the proposed arbitration further attention and having obtained the opinion of the Attorney-General, had changed its mind as to the qualification of arbitrators and recognized the justice of Nicaragua's claim that all four arbitrators should be citizens of Nicaragua. In view of Secretary Hay's letter to Mr. Merry of December 28, 1899, the company is satisfied that this statement of the Nicaraguan minister at Washington was entirely incorrect, as the records of the State Department will doubtless show.

Tenth. The refusal of the Government of Nicaragua to accept the arbitrators designated by the Maritime Canal Company was based upon the Government's claim that the arbitrators referred to in article 55 are judges at law and not mere arbitrators, and that under Nicaraguan law judges must be citizens of the Republic. As the rules of procedure referred to in article 55 had not been formulated, the Government claimed the right to organize a tribunal of arbitration by judges under the jurisdiction of the local courts and the general laws of Nicaragua, thereby ignoring and disregarding the provisions of article 55 of the concession, which clearly provide for a special court of arbitration to pass upon all differences which may arise between the contracting parties. Having refused to recognize the arbitrators appointed by the company, the Government proceeded to treat the case as though no appointments whatever had been made and to declare that the question in dispute had been decided in favor of the Government because of the failure of the company to appoint arbitrators within the four months' period provided for by article 55.

The minister of fomento, in his letter to Mr. Wieser, dated March 2, 1900, claims that the arbitrators referred to in article 55 of the concession must be deemed judges according to law, and that therefore it was proper that the ordinary judges of the Republic should organize the tribunal of arbitration with persons possessing all the qualities which judges are required by law to possess, one of which is that such judges must enjoy the full rights of citizenship. The minister also claims in his letter that the designation of arbitrators made by the company within the four months' period specified in article 55 was void and to be treated as if such appointment had never been made at all, for two reasons: First, because the appointment should have been made before a judge; and, secondly, because the parties appointed were disqualified by reason of their relations to the company. The minister entirely ignored the fact that the original designation of arbitrators by the Government of Nicaragua was made on January 23, 1900, by a decree of the President and not before a judge, and also that the arbitrators named by the company were no more disqualified by reason of their connection with the corporation than was Mr. Jose Dolores Rodriguez, who had represented the Government of Nicaragua on several occasions in matters relating to the canal, and who, on the 15th day of January, 1897, had addressed to the Hon. Richard Olney, Secretary of State of the United States at Washington, a communication attacking the integrity of the Maritime Canal Company and claiming in behalf of

Nicaragua that its rights had been forfeited. The minister of fomento closed his letter of March 2, 1900, by stating that the forfeiture of the concession took effect ipso jure because arbitrators had not been appointed by the company in proper time and in proper form, and the company had therefore been considered as assenting to the claim of the Government.

It will be seen, therefore, that the Government frankly admits that it arbitrarily treated as null and void the appointment of arbitrators made by the company and then caused a forfeiture of the concession to be declared in the local courts because of the company's alleged failure to designate arbitrators under the provisions of article 55.

The company submits that this arbitrary and unwarranted action on the part of the Government of Nicaragua was a manifest breach of the Cardenas-Menocal contract.

Eleventh. The Government of Nicaragua having arbitrarily and unlawfully attempted to deprive the company of its vested rights in the Cardenas-Menocal concession, without affording the company the hearing on the merits provided for in article 55 and expected by the United States, proceeded without lawful authority to seize and confiscate the property of the corporation situated at Greytown, claiming to be entitled to the same under article 54 of the concession. On August 10, 1900, Messrs. Chamberlain and Jeffries, representing the Government of Nicaragua, and accompanied by 60 laborers, seized and took possession of the company's railroad, locomotives, and rolling stock, notwithstanding the protests of the watchman in charge of the property at Greytown, and proceeded to tear up the rails and remove them. On the 12th day of August, 1900, the governor of Greytown, acting under instructions from the Nicaraguan Government, went to La Fe, sealed all the buildings of the company with his official seal, and notified the watchman in charge that by orders of the Government he took possession of everything belonging to the corporation. A protest was promptly lodged with the United States consul at Greytown, in the name of the Maritime Canal Company, against the action taken by the Government of Nicaragua and its representatives in seizing, taking, and removing the property at Greytown belonging to the company. The intention of the Government to seize and confiscate the property of the Maritime Canal Company was communicated to the agent of the canal company by the minister of public works in the following communication:

[Translation.]

"AUGUST, 1900.

"MR. AGENT OF THE MARITIME CANAL COMPANY,

"*Present:*

"According to article 54 of the contract celebrated for the opening of an interoceanic canal with Mr. A. G. Menocal on the 24th of April, 1887, which concession was ceded to the company you represent, I herewith give you notice that said contract having been declared forfeited, the Republic of Nicaragua enters into possession in perpetuity of the existing materials belonging to the Maritime Canal Company which were used to initiate some work done on the canal at Ciudad America and the San Juan River, as belonging to those comprised and classified in article 54. In consequence of this, and in order to specify and class said existing materials, so that it shall not be said later on that the Government has exceeded its authority or that other different statements shall be made, I wish that you personally or through a representative in the character of agent of the Maritime Canal Com-

pany of Nicaragua be present on the 20th of this month in the city of San Juan del Norte at the solemn act of making the inventory, which shall be made by the governor and 'intendant' of said district jointly with other employees of the Government and before the consul or consuls of other nations which are established at that place in order to give greater publicity to this act.

"Hoping you will acknowledge receipt of this communication, I am,
 "Your obedient servant,

"RAMIREZ,
 "*Minister of Public Works.*"

The Government of Nicaragua is now engaged in tearing up the rails of the road, which was constructed by the company at great cost, and is unlawfully confiscating the same and removing them to the interior, where they are being used in the construction of Government railways. The Government is also in unlawful possession of the other property of the company at Greytown, and has declared its intention of confiscating and removing all available material, rolling stock, tools, implements, and other property and of transferring the same to the interior. The company has protested, and is still protesting, against these arbitrary and unwarranted acts on the part of the Government of Nicaragua, but it has been refused protection by the Government of Nicaragua, and its protests have been entirely ignored.

Twelfth. Article 55 of the Cardenas-Menocal concession provides that before the initiation of the works of opening the canal the Government, with the concurrence of the company, shall formulate regulations in which shall be prescribed the rules by which the arbitrators are to be governed in all matters relating to procedure. This provision relates only to the preparation of rules under which the arbitrators are to proceed after they have been appointed. There is nothing in the concession providing that the arbitrators are to be appointed either as prescribed in these rules or under the jurisdiction of the local courts of Nicaragua. On the contrary, article 55 states the precise manner in which these arbitrators are to be appointed—two of them to be named by the State, and two by the company, and the rules referred to are those prescribing a method of procedure to be followed by the arbitrators after their appointment. By article 55 the duty of preparing these rules is placed upon the Government of Nicaragua, which must take the initiative, but such rules can have no force or effect until they are approved and concurred in by the company. The fact that no rules have been adopted up to the present time is due to the failure of Nicaragua to formulate the regulations required by article 55, and the company can in no way be prejudiced by this neglect of the Government. The local courts of Nicaragua have no jurisdiction whatever over the board of arbitrators provided for in article 55, except to see that their judgment is enforced, and the board's method of procedure is not restricted to that provided by the general laws of Nicaragua.

The said article 55 provides that all questions which may arise between the company and individuals residing in Nicaragua shall be determined by the ordinary tribunals of Nicaragua, in accordance with the law of the country, and that as to questions arising between the company and nonresidents of Nicaragua the rules of private international law shall be observed. The exact manner of litigating disputes between the company on the one part and residents or nonresidents on the other is therefore expressly determined by the concession, which also provides in express terms the method of disposing of all questions which

may arise between the Government and the company in reference to said concession. All misunderstandings between the two contracting parties in regard to the interpretation of the stipulations of the concession are to be submitted to a tribunal of arbitrators composed of four members, two of whom shall be named by the State and two by the company, and the decision of a majority of these arbitrators is to be final and without appeal. The only restrictions placed upon this court of arbitration are the rules as to procedure which are to be adopted by agreement between the company and the Government. This provision of the concession clearly creates a special court of arbitration for the determination of questions affecting the proper construction to be given to the articles of said concession, such court to consist of arbitrators to be appointed by both parties to the controversy, and to be governed by rules of procedure to be agreed upon by both sides. Nicaragua, in agreeing to this court of arbitration, has waived any right she might have had to proceed against the company in the local courts of the Republic in matters covered by article 55, and the jurisdiction of these courts is limited to questions arising between the corporation and individuals residing within the boundaries of the Republic. The very object of creating this court of arbitration was to prevent any arbitrary action being taken against the company by the Government of Nicaragua through the medium of its partisan local tribunals.

As to the selection of arbitrators, it may be that either Nicaragua or the company would have the right, under a strict interpretation of article 55, to object to the nomination of any person who might be eligible as the fifth arbitrator, in case of a disagreement between the four named by both parties, and for this reason the company withdrew the original appointment of Mr. William L. Merry and designated in his stead Mr. A. G. Menocal. Except as to the possible limitation above referred to, the concession clearly gives the company the absolute right to select and appoint two of the four arbitrators without any restrictions whatever, and the contention of the Government of Nicaragua that the arbitrators named by the corporation must be citizens of that Republic is without the slightest foundation and can not be sustained. Such a construction of article 55 would defeat the very objects to accomplish which the court of arbitration was created. The controversy which has arisen under articles 4, 5, and 48 is one between the Government of Nicaragua and a foreign corporation created by the Congress of the United States. The right of the company to name United States citizens as its appointees is just as absolute under article 55 as is Nicaragua's right to name its own citizens as the appointees of that Republic, and, as already stated, this right is one which has been fully recognized by the Department of State of the United States.

Thirteenth. The Government of Nicaragua has attempted to draw a distinction between "arbiter" (arbitro) and an "arbitrator" (arbitrador), claiming that the word "arbitro" used in article 55 of the concession means a "judge," according to law, and not an arbitrator, as claimed by the company. In Spanish dictionaries the word "arbitro" is defined as being an arbitrator or referee chosen by the parties to settle a difference; and an "arbitrador" is defined as an arbiter, umpire, or referee to whom any disputed matter is left for decision. There seems to be absolutely no difference in the meaning of these two words as used in law, and they are as synonymous in the Spanish language as they are in the English language. Both arbiters (arbitros) and arbitrators (arbitradores) are persons to whose judgment or decision matters in dispute are submitted by the consent of parties. They decide accord-

ing to their best judgment on principles of equity, after a full hearing of the cases referred to them, and their powers in this respect are only limited by the provisions of the arbitration agreement under which the controversy is submitted. A "judge" (juez), on the other hand, is an officer lawfully appointed or elected who acts under the Government, and who decides questions and disputes in a court of justice, according to law. Citizenship may be a necessary qualification for a "judge" who is called upon to administer the laws of the Republic, but it is not a necessary requirement in the case of an "arbiter" or "arbitrator" chosen by parties to determine the merits of a controversy. Whatever may be the provisions of the statutes of Nicaragua in reference to the qualification of judges, the company has not been able to find, nor have the officials of Nicaragua been able to point out, any law providing in expressed terms that an arbiter (arbitro) must be a citizen of Nicaragua. That the Congress of Nicaragua did not use the word "arbitro" in the Cardenas-Menocal concession with any such limited meaning is proved by the provisions contained in article 55 for the selection of a fifth arbitrator. In case of a tie vote, the four arbitrators (arbitros) are to name, by mutual consent, a fifth arbitrator (arbitro) whose decision shall be final. If unable to agree to such nomination, they must draw by lot the names of the diplomatic representatives accredited to Nicaragua, and the person whose name is first drawn shall exercise the functions of the fifth arbitrator (las funciones de quinto arbitro). As none of the diplomatic representatives accredited to Nicaragua are likely to be citizens of that Republic, it is quite clear that it was never intended by the Congress of Nicaragua to require that the court of arbitrators should be composed exclusively of Nicaraguan citizens. The Cardenas-Menocal concession was an act of the legislative and executive branches of the Government, and its provisions creating a court of arbitration are legally binding upon the Republic as well as upon the company.

Fourteenth. The Maritime Canal Company of Nicaragua duly notified the Government of Nicaragua of its intention to arbitrate the questions which have arisen in reference to articles 4, 5, and 48 of the concession, and the Government of Nicaragua agreed to submit the matter to the court of arbitration provided for in article 55. The company duly appointed Messrs. Rudolf Wieser and A. G. Menocal as its arbitrators, and the Government selected Messrs. J. D. Rodriguez and Bruno H. Buitrago as arbitrators on behalf of the Republic. The Government of Nicaragua then arbitrarily refused to recognize the appointments made by the company and declined absolutely to arbitrate the questions at issue before the four arbitrators named as aforesaid. Notwithstanding the company's protests, the Government then instituted proceedings in the local court of Nicaragua in contravention of the provisions of article 55 of the concession, and obtained in said tribunals a declaration of forfeiture of the Cardenas-Menocal concession. This declaration of forfeiture, not having been pronounced in conformity with the provisions of the concession, can have no binding force whatever, and the Government of Nicaragua, in refusing to make the submission to the court of arbitrators except upon its own terms and conditions in the selection of arbitrators, has been guilty of a manifest breach of contract.

Fifteenth. The Maritime Canal Company of Nicaragua for the reasons above stated hereby enters its solemn protest with the Department of State of the United States against the arbitrary, unlawful, and oppressive acts of the Government of Nicaragua.

First. In declining to arbitrate the matters in controversy in the

manner provided for by article 55 of the Cardenas-Menocal concession and in refusing to recognize and in treating as null and void the appointment of Messrs. R. Wieser and A. G. Menocal as arbitrators, duly made by the company in conformity with the provisions of said article 55.

Second. In refusing after the appointment of arbitrators to proceed with the arbitration in the manner prescribed by said article 55 and in violating the provisions of the said concession by instituting proceedings against the corporation in the local tribunals of Nicaragua.

Third. In declaring a forfeiture of the said Cardenas-Menocal concession before the questions raised as to the interpretation of articles 4, 5, and 48 had been properly submitted to the tribunal of arbitrators specified in said article 55.

Fourth. In illegally seizing and confiscating the property and vested rights of the Maritime Canal Company and in refusing to surrender the same.

Sixteenth. The Government of Nicaragua is responsible to the United States for the wrongs perpetrated by Nicaragua against the Maritime Canal Company of Nicaragua. These wrongs form an equally just ground for complaint on the part of the United States whether they proceed from the direct agency of the Government of Nicaragua or were inflicted by the instrumentality of the tribunals of that Republic. The authority of Nicaragua within its own territory is the absolute and exclusive authority of a sovereign power, and the company has absolutely no other mode of redress or protection against the wrongs which have been inflicted upon its bondholders and stockholders by the Government of Nicaragua except through the intervention of the United States.

Mr. Cass, Secretary of State, in his communication to Mr. Lamar of July 25, 1858, states:

“What the United States demand is, that in all cases where their citizens have entered into a contract with the proper Nicaraguan authorities and questions have arisen or shall arise respecting the fidelity of their execution, no declarations of forfeiture, either past or to come, shall possess any binding force unless pronounced in conformity with the provisions of the contract, if there are any, or if there is no provision for that purpose, then, unless there has been a fair and impartial investigation in such a manner as to satisfy the United States that the proceeding has been just and that the decision ought to be submitted to. Without some security of this kind this Government will consider itself warranted, whenever a proper case arises, in interposing such means as it may think justifiable in behalf of its citizens who may have been or who may be injured by such unjust assumption of power.”

The Department of State, in the communication of Secretary Hay, dated December 28, 1859, recognized the right of the company under article 55 of the concession to choose freely two of the arbitrators, and that the refusal of the Nicaraguan Government to make the submission except upon its own terms and conditions in the selection of the arbitrators would be a manifest breach of the contract. This breach of contract having taken place, the United States can not justly permit the Government of Nicaragua to wrongfully destroy and confiscate the vested rights and property of the Maritime Canal Company of Nicaragua, a corporation which it has itself chartered, and should, if necessary, employ its sovereign powers to protect the company against the wrongs done to said corporation by the said Government of Nicaragua.

Wherefore the Maritime Canal Company of Nicaragua prays the

assistance and intervention of the Government of the United States in obtaining from the Government of Nicaragua a full and complete recognition of the rights of the company under the Cardenas-Menocal concession and in protecting from wrongful seizure and confiscation property and rights justly acquired and solemnly guaranteed.

Dated October 23, 1900.

THE MARITIME CANAL COMPANY OF NICARAGUA,
By HIRAM HITCHCOCK, *President*.

The SECRETARY OF STATE OF THE UNITED STATES.

The CHAIRMAN. You are the president of the construction company?

Captain MILLER. Yes, sir.

The CHAIRMAN. Where was that company chartered?

Captain MILLER. Chartered in Vermont.

The CHAIRMAN. It has no United States charter?

Captain MILLER. None whatever.

The CHAIRMAN. Chartered for the purpose of taking a contract to build the canal?

Captain MILLER. Yes, sir.

The CHAIRMAN. What contract was made with the Maritime Canal Company as to building the canal?

Captain MILLER. The original contract was made with the Nicaragua Canal Construction Company, which the Nicaragua Company took over as among the assets of that company when it went into the hands of the receiver, which was a contract to build the canal on a basis of bonds and stock as the work went along. They were to receive certain percentages of bonds and stock.

The CHAIRMAN. Bonds and stock in what?

Captain MILLER. In the Maritime Canal Company.

The CHAIRMAN. Was the Maritime Canal Company under any obligation to the construction company to furnish them money to build the canal?

Captain MILLER. Except for the amount of work done.

The CHAIRMAN. Money, or bonds and stock?

Captain MILLER. Bonds and stock.

The CHAIRMAN. No money?

Captain MILLER. No money.

The CHAIRMAN. In other words, they took the contracts that they would accept bonds and stock for building that canal?

Captain MILLER. Yes.

The CHAIRMAN. Out and out?

Captain MILLER. Yes.

The CHAIRMAN. Equipping it also?

Captain MILLER. Yes; the usual contract to do the whole work.

The CHAIRMAN. They were to do the whole work within the period of time fixed in the concession from Nicaragua and Costa Rica?

Captain MILLER. Yes.

The CHAIRMAN. And they were to receive payment in the bonds and stock of the Maritime Canal Company?

Captain MILLER. That is right, sir.

The CHAIRMAN. So when these bonds and this stock were turned over to that company from time to time, the debt of the Maritime Canal Company was thereby discharged?

Captain MILLER. Yes.

The CHAIRMAN. Then they took the bonds and put them on the market?

Captain MILLER. Yes.

The CHAIRMAN. They did the marketing of the bonds?

Captain MILLER. Yes.

The CHAIRMAN. And in that way, and by subscriptions to the stock of the construction company, you realized about how much money?

Captain MILLER. Between four and five million dollars.

The CHAIRMAN. From what sources did that money chiefly come?

Captain MILLER. It came from the United States.

The CHAIRMAN. From the people of the United States?

Captain MILLER. All of it, I think. I do not think there were any foreign stockholders or bondholders.

The CHAIRMAN. Scattered about, all over the country?

Captain MILLER. All over the country, to the amount, I think, of about eight or nine hundred stockholders.

Senator KITTREDGE. Have you a list of those stockholders?

Captain MILLER. They have in New York; yes.

Senator KITTREDGE. Can you give us that list in connection with your testimony?

Captain MILLER. Yes.

Senator KITTREDGE. The names of the stockholders and their post-office addresses?

Captain MILLER. Yes; it is a rather lengthy list.

The CHAIRMAN. I had them printed years ago in the record.

Captain MILLER. Men from the North and South, the East and the West.

The CHAIRMAN. That stock was subscribed by American citizens along the Atlantic seaboard, was it not, from Richmond to New York, chiefly?

Captain MILLER. Yes; but there are stockholders all over the country, Senator.

The CHAIRMAN. Those are the men that paid the four and a half million dollars turned over to the construction company and expended in the construction of this canal?

Captain MILLER. Yes, sir.

The CHAIRMAN. And that money was paid to the construction company?

Captain MILLER. Paid to the construction company.

The CHAIRMAN. And the construction company sold stock in the Maritime Canal Company that it received?

Captain MILLER. Yes; as they received it.

The CHAIRMAN. And bonds?

Captain MILLER. Yes.

The CHAIRMAN. Sold them to these people?

Captain MILLER. Yes.

The CHAIRMAN. And in that way raised four and a half million dollars?

Captain MILLER. Yes.

The CHAIRMAN. Was that money expended economically?

Captain MILLER. Very. More was done for that money than was done for \$50,000,000 by the Panama people.

The CHAIRMAN. Was this company working in good faith to build the canal, or was it making an experiment, to put something on the market for sale?

Captain MILLER. Absolutely in good faith, sir.

The CHAIRMAN. To build the canal?

Captain MILLER. Yes, sir.

The CHAIRMAN. And after the reverses of the panic of 1893, which affected all interests in the world, you then found difficulty in going on with the project?

Captain MILLER. Great difficulty, sir.

The CHAIRMAN. Do you know whether either the Maritime Canal Company or the construction company made any application to the Government of the United States in any form for relief or assistance in getting money or in getting any indorsements?

Captain MILLER. Never, to my knowledge.

The CHAIRMAN. Well, do you know that they did not?

Captain MILLER. I know they did not.

The CHAIRMAN. That is true. I know they did not. So that you were conducting it upon the basis of the money the people themselves could raise, and putting it into that work?

Captain MILLER. Yes, sir.

Senator HANNA. Did Mr. Hitchcock have anything to do with the construction company?

Captain MILLER. He helped us out with a great deal of money, much to his detriment.

Senator HANNA. By the purchase of stock and bonds?

Captain MILLER. Yes, sir; almost ruined himself, I think.

Senator HANNA. Was he an officer in the construction company?

Captain MILLER. Oh no, sir.

Senator HANNA. Had no connection with that?

Captain MILLER. Never, as a director.

The CHAIRMAN. Mr. Hitchcock contributed out of his private fortune, as I understand you, an amount that almost wrecked him?

Captain MILLER. I am afraid it did, sir. He died a poor man, and I was talking to one of his friends the other day, and he said it was greatly due to his patriotic endeavors for eighteen years to build the Nicaragua Canal, and I know he put large amounts of money into it—very large. He was enthusiastic on the subject.

The CHAIRMAN. Name some of the other gentlemen in New York City and the State of New York who contributed in this way, or who gave very largely to the support of this movement to build this canal.

Captain MILLER. I can name the following gentlemen as ardent supporters of the canal for many years, they having used their influence and given much money to the project: Judge Henry E. Howland, Judge Charles P. Daly, Mr. Alfred Hoyt, Mr. James Roosevelt, Hon. Warner Miller, Mr. H. L. Hotchkiss, J. F. O'Shaughnessy, A. R. Lancaster, who has a large Richmond contingent back of him, Alexander Mason, George West, F. F. Thompson, C. P. Treat, Franklin Fairbanks, Frederick Billings, H. A. Parr, John R. Bartlett, Robert Garrett, T. Harrison Garret, W. P. Anderson, H. O. Armour, W. H. Bronson, L. P. di Cesnola, A. S. Crowninshield, H. L. Einstein, N. K. Fairbank, R. C. Shannon, John L. Williams, Stuyvesant Fish.

The CHAIRMAN. I was speaking of the men who were most active in the promotion of the Nicaragua Canal.

Captain MILLER. Mr. Smith M. Weed, who was at one time in Congress.

The CHAIRMAN. Well, we had some members of the Senate, did we not, as directors—Mr. McDonald, of Indiana?

Captain MILLER. Yes; Mr. McDonald was at one time very much interested in it. Whether he held any stock or not I am not sure.

The CHAIRMAN. Mr. Eustis of Louisiana?

Captain MILLER. Yes; Mr. Eustis was a stockholder and director, and very much interested in it.

The CHAIRMAN. Well, I merely wanted to bring out the names.

Captain MILLER. I am trying to get people in different walks of life.

The CHAIRMAN. I merely wanted to show the type of men concerned in this movement.

Captain MILLER. They stand high in New York.

Senator HANNA. Were they stockholders in the Maritime Canal Company or stockholders in the construction company?

Captain MILLER. They were stockholders in the Maritime Canal Company and also in the other.

Senator HANNA. In both?

Captain MILLER. Yes.

The CHAIRMAN. Do you know that the Maritime Canal Company made any purchases of land west of Lake Nicaragua, between that and Brito, from the Government of Nicaragua, or anybody else?

Captain MILLER. I do not know positively. I know that there was land bought there. I have never seen the deeds, but I know that the Maritime Canal Company stated in its report that it bought land there.

The CHAIRMAN. I had the impression that they bought no land there. It must have been very small pieces for particular purposes, because the Government of Nicaragua had made a concession to them of lands for all canal purposes between Brito and Greytown.

Senator KITTREDGE. I think the reports will show that they acquired large tracts besides that.

The CHAIRMAN. By purchase from the Government?

Senator KITTREDGE. By purchase, I am not sure from whom; but they did make purchases.

The CHAIRMAN. If they have any lands there in fee simple, of course they are like any other owners. Well, Captain Miller, did you make any personal examination of this Nicaragua route?

Captain MILLER. Yes.

The CHAIRMAN. In what character were you acting?

Captain MILLER. I was an officer of the Navy at the time.

The CHAIRMAN. Where did you make the examination? Did you have any connection with the surveys?

Captain MILLER. Yes; I was on the original surveys in 1872 and 1873.

The CHAIRMAN. In what connection—in what character were you serving?

Captain MILLER. I was one of the officers of the survey.

Senator HANNA. Designated by the Government?

Captain MILLER. Designated by the Government. In the year 1872 I was ordered to join the Lull surveying expedition of Nicaragua, left New York in December, went down in a Government ship with other officers—a party of eight or nine officers—and about 150 men. We went to Greytown.

The CHAIRMAN. Did you land at Greytown?

Captain MILLER. Landed at Greytown. We fortunately found the harbor closed. The river, which formerly had entered at Greytown, had changed its course and entered 20 miles south of the old Greytown harbor. Consequently —

The CHAIRMAN. You say south; you really mean east, do you not?

Captain MILLER. The coast takes a turn there to the southward and eastward. After landing we started from Greytown to the lake, as it had been decided to begin the surveys from the west coast. As we started up the river the first noticeable point was the fact that nature had drifted the river from Greytown to a point 20 miles away; thus the large amount of silt and detritus which formerly came from the rivers of Costa Rica was no longer a menace to the harbor. The mountain sand from the rivers entering the south bank of the San Juan was diverted away from Greytown. These rivers are the San Carlos and Serapiqui and are subject to floods. There are no large freshet-bearing rivers entering from the north bank; but to the northward of the San Juan, for 10 miles back of Greytown, there was a series of swamps and lagoons. The lagoons averaging in depth from 10 to 14 feet, they were a partially constructed canal at tidewater, and both they and Greytown Harbor would never be subject to the curse of a silt-bearing river. I do not know whether you catch my meaning.

Senator HANNA. Yes; I do, exactly.

Captain MILLER. In other words, the point I want to make is that the absence of the river from Greytown has been a blessing, and that the bar across the entrance has also been a benefit. If a jetty is built there a harbor can be easily maintained, and the lagoons and lakes back of Greytown for 10 or 15 miles at tide level can, by a small amount of dredging, accommodate the ships of the world. This point was among the first that struck us; even then people were talking of the lack of harbors on the Nicaraguan route.

Senator HANNA. Who was the engineer in charge of this party?

Captain MILLER. Mr. Menocal. It was his first work there. After we had gone up the river about 30 miles and found a series of swamps and alluvial land, we reached solid land.

The whole character of the country changed. The San Juan became narrower, with a deep channel, and for 65 miles passed through high banks and hills with no freshet-bearing rivers entering on either side, as the whole country in that region drains into the lake, which never rises more than 9 or 10 feet. It therefore seems practicable, even then, to build a dam 65 miles to the eastward of the lake, in order to throw the water to the height of the level of the lake.

Senator HANNA. Is that Mr. Menocal's plan?

Captain MILLER. It is the general plan. Then, as now, the only difference being the question as to whether one or two dams should be built in the 65 miles spoken of above, and what the route should be through the 30 miles of lowlands to the eastward of the 65 miles.

To continue the story of our trip. At the end of the 65 miles we came into Lake Nicaragua, which we found about 120 miles long and 40 miles broad. It drains 10,000 square miles of country, and by reason of its magnitude never rises more than 10 feet in extreme rainy season. Next we crossed the lake. I found there a steamer, called the *Commodore Adams*, which had come from New York. I went aboard of her. She drew over 9 feet of water. She had been brought up the San Juan River to this point, I think, under her own steam most of the way, although she had to be lightened through the Castillo Rapids, which, if I remember correctly, are some 17 miles from the lake. These rapids are almost falls, with only about 4 feet on them. The water below them is deep, and there was plenty of it above Castillo to carry her up the rest of the river and to the west shore of Nicaragua.

When I saw her she was anchored within 12 miles in a straight line

from the Pacific Ocean. If I had gone up 40 feet on her mast I would have been above all land between me and the Pacific Ocean, and could probably have seen vessels lying in the harbor at Brito. Then we crossed the land to Brito. The region is cultivated with haciendas or farms. It was a chocolate and coffee region. In this locality there were a number of indigo plantations with vats built of concrete sunk into the ground. These vats are very ancient and solid. They were perfectly intact, showing that no earthquakes had affected them. This is important, as they are of the same kind of underground construction which would be used for dams. The above are the principal points that struck us as we first crossed the Isthmus, but much more was noted, namely, the scenery, the wonderful beauty of the landscape, the cultivation and possibilities of the country. The mountains rose to a height of 8,000 feet in places, and they have all the climates from the tropic to the temperate zone. To the southward of the lake was the Costa Rican boundary line, and back of it a wonderful, rich region.

As a notable indication of the development of that country during the last few years, I would state that the railroad running from San Jose is the greatest banana region of the world, the United Fruit Company, an American institution, shipping last year about 19,000,000 bunches of bananas into the United States. The mines of Costa Rica and Nicaragua are being developed, and the coffee trade is increasing. All that is needed is transportation facilities; a new domain would then be opened up, equivalent in area to Vermont, New Hampshire, Massachusetts and New York, or about 82,000 square miles. In this region is a population of only 600,000 people. All of it would immediately come under our influence the moment a canal was begun. In addition, the country is full of timber and provisions. It is a healthful line directly in the center of the trade-wind belt. I do not know whether you gentlemen have studied the question of the advantage of the trade winds or not.

Senator HANNA. We have heard that discussed here.

Captain MILLER. I suppose you have. If I am bothering you, I will not go on.

The CHAIRMAN. You are not bothering me, because I want to know about those trade winds.

Captain MILLER. The trade-wind region is one much cooler than either that north or south of it. I spent many months in the "trades" when I was in the Navy. When you go north of them, you have counter hot winds; when south, you are in the area known as the "doldrums," which means calms or exceedingly light airs. A vessel from Liverpool or New York carries her wind right to Greytown; thus the advantage for tramp steamers and for our new five and six masted coasters. A sailing vessel will carry this wind, not only to Greytown, but up the river, across the lake, through the canal, and into the Pacific. Brito is a weather shore. We need no harbor there, only a small breakwater. Vessels run out of Brito and go on about their business.

Senator HANNA. How is it when she comes back?

Captain MILLER. She runs down with the westerly wind north of the "trades" until she gets well to windward—if she is coming from the north, goes on the port tack when she strikes the "trades;" if she is coming from the south, she makes the harbor on her starboard tack.

Senator HANNA. You say the trade winds blow off shore and that she will have a fair wind through the canal when she is west bound. So she is going to have head winds when she comes back.

Captain MILLER. Exactly.

Senator HANNA. So it is about an even thing.

Captain MILLER. Oh, no; we do not mind head winds. They are much better than no wind at all.

Senator HANNA. It makes a difference whether you have a wind with you or against you?

Captain MILLER. Yes; but the point is you have always got a wind which is the motive power of sailing ships.

The CHAIRMAN. But in the calm belt you do not have any sailing power at all?

Captain MILLER. You do not have any sailing power. I can give you an example of that in a locality farther south in a moment. I would like to state another factor in favor of the Nicaragua Canal. In going through, the ships use two canals, one at each end, and altogether separated. These are about 40 miles on one end and 20 on the other. Between them there are 135 miles of free navigation in a large lake, almost as big as one of the northern lakes in this country. What is more, the water is fresh, which means death to barnacles. Now, leaving out of the question that it is over 600 miles shorter from New York to San Francisco by the Nicaragua Canal, we have a tremendous advantage in that 135 miles of smooth water, as against rough water in an open sea, and what is more, assuming that you are thirty-six hours longer in going through the canal, twenty-four hours of that is not going to count at all.

Senator HANNA. You would have to have a tug for a sailing ship?

Captain MILLER. I will come to that in a moment; but the point I want to make is that the twenty-four hours is not going to count, because you are going to increase your vessel's speed by taking the barnacles off in the fresh water. You spoke about tugs for sailing vessels.

Senator HANNA. Yes.

Captain MILLER. There will be small need for tugs in the 135 miles of summit-level navigation. A large portion of the distance will be deep water where fast ships can pass slower ones, and going to the westward sailing ships will have a fair wind. In my opinion, no vessels will hurry through the lake, but will stop there to victual, get fresh water, or to obtain the varied products of the country. Suppose they do take a tug. Now, we will go back to——

Senator HANNA. Let us finish this first.

The CHAIRMAN. Yes; let us finish this first.

Senator HANNA. Finish Nicaragua before we come to Panama. Any vessel passing through the Nicaragua Canal would probably take a tug from Greytown to Brito, would she not?

Captain MILLER. No; I should not think she would. I think she would take care of herself through the lake. Then she would take another tug.

Senator HANNA. Would that be the usual way of doing business? Would the tugs do that sort of business? Would they not insist on going from ocean to ocean, from Greytown to the Pacific Ocean?

Captain MILLER. Suppose they did.

Senator HANNA. Well, then they would take a tug through.

Captain MILLER. They would do exactly what they do in Long Island Sound or anywhere else, when they come into the harbor. I do not see much difference there.

Senator HANNA. What I want to get at is that the towage part of it would be from Greytown to the Pacific Ocean.

Captain MILLER. For a sailing ship?

Senator HANNA. Yes.

Captain MILLER. Not necessarily so, I think.

Senator HANNA. What would be the natural course pursued?

Captain MILLER. To take it right through, I should think; yes.

Senator HANNA. That is what I thought.

Captain MILLER. Yes, that is what I should think if I was a captain of a ship. I do not suppose it would cost any more.

Senator HANNA. No, probably not.

The CHAIRMAN. You mentioned Long Island Sound.

Captain MILLER. I suppose the towing would cost about \$5 an hour, probably.

The CHAIRMAN. You spoke about Long Island Sound. What is the distance in Long Island Sound that a sailing ship would have to be towed, in order to make time?

Captain MILLER. It depends on the tide a good deal. They take tows down about 15 miles outside.

The CHAIRMAN. To carry them through the Sound?

Captain MILLER. No; they get under sail about up at Huntington.

The CHAIRMAN. About how many miles?

Captain MILLER. The conditions are exactly similar to what they would be for a sailing ship in Lake Nicaragua, except, as Senator Hanna seems to think, and I think perhaps there is a good deal in what he says, that a tug would naturally take her charges all the way through.

The CHAIRMAN. What would be the distance that a sailing ship would be towed in Long Island Sound?

Captain MILLER. About 25 miles from New York.

The CHAIRMAN. Are all the sailing vessels towed through Long Island Sound, or do they go through on their own sail?

Captain MILLER. They go through on their own sail after they get out from the region of Hell Gate.

The CHAIRMAN. I do not mean after they get out?

Captain MILLER. After they get out 25 miles.

The CHAIRMAN. Do all sailing vessels have to be towed through a part of Long Island Sound?

Captain MILLER. All large vessels, yes; going through Hell Gate. Sailing vessels do not undertake to go through under their own sail.

The CHAIRMAN. So that all that vast commerce is carried on by tugs?

Captain MILLER. Yes.

Senator HANNA. For a distance of 25 miles.

The CHAIRMAN. That is what I mean. And you say the towage is usually charged for the whole distance instead of the 25 miles. Is that what I understood you to say?

Captain MILLER. Oh, no, sir; I did not say that. I said that probably in Nicaragua if the canal was built the towage would be charged on sailing vessels all the way through. I do not know how that would be. It would depend a good deal on how much competition there was. I do not think it is a factor at all.

The CHAIRMAN. Do you say that these trade winds that blow through the funnel there from Greytown to Brito go right on out to sea?

Captain MILLER. Right on out to sea.

The CHAIRMAN. Across the Pacific?

Captain MILLER. Yes.

The CHAIRMAN. Do they lie above or below or between the doldrums?

Captain MILLER. The trade winds lie between the doldrums and the

northwest winds, which are the counter winds above. There is always more or less of a doldrum belt between the northeast and the northwest winds. That is, take the line that runs along Lower California, a calm belt exists there.

The CHAIRMAN. You are a navigator and you have had experience, and what I want to get at is this: Is there a current of air that passes across Nicaragua out past Brito which goes on out into the Pacific Ocean by force of this pressure of air that is called the trade winds? Does that continue on into the Pacific Ocean?

Captain MILLER. It continues on for about 9,000 miles; over to the Fiji Islands anyhow.

The CHAIRMAN. Is it perennial?

Captain MILLER. Always.

The CHAIRMAN. Does it continue throughout the year?

Captain MILLER. Always.

The CHAIRMAN. It continues throughout the year?

Captain MILLER. It is lighter at some times than at others, but it is always there.

The CHAIRMAN. So that it can be counted on, I suppose, as a reliable power for getting ships away from the coast at Brito and getting them out into the bosom of the Pacific Ocean?

Captain MILLER. Yes.

The CHAIRMAN. You regard that as a fixed condition of nature?

Captain MILLER. I do, sir. I have had some experience farther south.

The CHAIRMAN. Now we will go farther south. What experience have you had farther south and, where was it?

Captain MILLER. I was in the harbor of Panama, I think it was the summer of 1870. We lay there for about three months.

The CHAIRMAN. What ship were you on.

Captain MILLER. On the *Jamestown*.

The CHAIRMAN. An American ship of war.

Captain MILLER. An American man-of-war, the *Jamestown*, Capt. William Truxton.

The CHAIRMAN. A sailing ship?

Captain MILLER. A sailing ship.

The CHAIRMAN. Why did you lie there for three months?

Captain MILLER. There were some difficulties there ashore, and we were looking out for the Panama Railroad. I think one of the perennial revolutions was threatened.

The CHAIRMAN. While you were there did you take observation of the winds and conditions of the atmosphere?

Captain MILLER. Yes; it was the rainy season, calms and rains nearly every day, torrential rains.

The CHAIRMAN. How did you get out of there?

Captain MILLER. Well, I do not know how we ever got out of there, Senator. It took us twenty days to get out of that bay.

The CHAIRMAN. You mean to get out of the bay?

Captain MILLER. I do not mean the bay of Panama, but I mean the gulf of Panama. That is about 400 and odd miles, if I remember correctly. It is a long time ago, but we had no tug, and the current stood us to the westward and southward. There was a strong current there and a great many islands, and we would get out a little way and then we would drift back with the incoming tide, which rose from 22 to 25 feet, and then we would start out again. Then would come one of

those tremendous rains, like the worst kind of a thunderstorm we ever see here. So we drifted all about the bay. I wish I had a copy of that log. We were some five or six days, if I remember correctly, in clearing the bay proper, and then we were some fifteen days more in getting out of the gulf.

The CHAIRMAN. By getting out of the bay you mean getting outside of the islands?

Captain MILLER. Yes; the Tobago Islands and the others there. Then we were some fifteen days before we struck the trade winds. We were bound for the Fiji Islands, then we struck the "trades" and carried them straight over to the Fiji Islands with the wind aft all the way, a good breeze.

The CHAIRMAN. During the time of your stay in the bay of Panama on that occasion did you observe whether sailing ships carried any freights to that railroad?

Captain MILLER. No, sir; there were none there at all that I remember. All the freight came both from the south and the north, by the two lines of steamers, the Pacific Mail and the steamers which ran to South American ports.

The CHAIRMAN. Did sailing vessels visit the port of Panama while you were there?

Captain MILLER. No, sir; none except small coasters and vessels of that sort. I do not remember any sailing ships there at that time. It is not a harbor that is ever visited by sailing ships. It is very difficult for them to get in and out.

The CHAIRMAN. Why do they not go there?

Captain MILLER. Because it is in the doldrum region, and there is no way of getting in and out of the harbor on account of the lack of wind, the strong tide, and the bad weather generally. It is very uncertain weather, very rainy, very hot, a most unhealthy place.

The CHAIRMAN. How did you ascertain about the health, if you were aboard ship? Were your men sick?

Captain MILLER. We used to have there what they call the calentura, a malarial fever that exists there.

The CHAIRMAN. Aboard ship?

Captain MILLER. We had no yellow fever on board ship. The men were kept pretty well. I do not think there was any yellow fever at that time ashore.

The CHAIRMAN. Did you know anything about the health of the people at Panama city while you were there; or the country around the city?

Captain MILLER. They have the Isthmus fever at all seasons of the year, and had it then. It is an intermittent fever called the "Chagres."

The CHAIRMAN. Is it a dangerous fever?

Captain MILLER. Not always, sir; no, sir. It is a low fever, but it does not become dangerous until they get another fever, the name of which I can not remember; but there is a dangerous fever that comes after the Chagres, for which they have a native name. It lasts two or three weeks, with a crisis. It is a remittent fever.

The CHAIRMAN. Do you know what was the general condition of the health of the people at Panama and in the vicinity during the time of your long visit in the bay there?

Captain MILLER. The usual condition there, with more or less fever, but no yellow fever at that time. I should remember it if there had been.

The CHAIRMAN. What sort of a movement was it that your naval vessel was down there to prevent or to stop? Was it an invasion from some other country, or was it a local disturbance?

Captain MILLER. My recollection is that it was a local disturbance. Certainly there was no invasion from any other country. At that time the Government kept a ship at Panama most of the time, and also, I think, one of the smaller ships at the Aspinwall terminus.

The CHAIRMAN. Was there any insurrection or outbreak going on at the time you were there?

Captain MILLER. No, sir; none at Panama.

The CHAIRMAN. Was there on any other part of the Isthmus?

Captain MILLER. None that I remember, sir.

The CHAIRMAN. You were put there for precautionary measures?

Captain MILLER. Yes.

The CHAIRMAN. The Government kept a ship there?

Captain MILLER. The Government at that time kept a ship there.

Senator HANNA. Was there any work being done on the Panama Canal at that time?

Captain MILLER. That was long before that; back in 1870.

The CHAIRMAN. But the railroad was completed then, was it?

Captain MILLER. Oh, yes.

The CHAIRMAN. Did you ever spend any other time in Panama Bay?

Captain MILLER. Simply as I said in the beginning, as I went across the Isthmus from Colon, from Aspinwall, and took a ship north.

The CHAIRMAN. How long did you wait for the ship to go north?

Captain MILLER. Simply a few hours.

The CHAIRMAN. Were you ever afterwards on the line between Panama and Colon, on the railroad there?

Captain MILLER. That is the only time.

The CHAIRMAN. You were only across the Isthmus once, then?

Captain MILLER. That is all.

The CHAIRMAN. You spoke of being in Colon also.

Captain MILLER. I was there in 1868.

The CHAIRMAN. What ship did you go on?

Captain MILLER. The *Minnesota*.

The CHAIRMAN. What was she doing down there?

Captain MILLER. She was down there to transfer officers, among them myself, to the Pacific. She was on a cruise and stopped in there to transfer us to the Pacific Squadron.

The CHAIRMAN. Did she go inside the bay of Colon?

Captain MILLER. She lay in the roadstead.

The CHAIRMAN. Did she go into the harbor of Colon?

Captain MILLER. No, sir; she could not get in there. She drew 23 feet of water, that big ship.

The CHAIRMAN. She could not get into the harbor?

Captain MILLER. Well, it might be called a harbor. It is open to the northward.

The CHAIRMAN. What they call the harbor, the anchorage inside.

Captain MILLER. It is not protected against the northerly winds.

The CHAIRMAN. I understand that; but was that as near the coast as you could go, as near to the pier?

Captain MILLER. Yes; a vessel drawing that much water, 23 feet.

The CHAIRMAN. How far out did you lie?

Captain MILLER. I do not remember, Senator.

The CHAIRMAN. How long did you stay there?

Captain MILLER. I was transferred at once, probably a day or two after we got there.

The CHAIRMAN. And then you went off to sea?

Captain MILLER. I went to the Pacific and went to sea.

The CHAIRMAN. You do not know what became of the ship after you left it—whether she stayed there or went away?

Captain MILLER. I think she went directly away. Her mission was fulfilled then.

The CHAIRMAN. Was there any heavy sea while you were there?

Captain MILLER. No; it was smooth when I was there.

The CHAIRMAN. What month was it?

Captain MILLER. It was one of the early winter months. I do not remember, it is so long ago.

The CHAIRMAN. Please give the committee some idea of what they call the bay of Colon, stating the width between the outer points of that bay.

Captain MILLER. I do not think my impression of Colon would be worth a great deal at present, because I understand they have altered it since I was there. I forgot to state that I went in there in 1873 and, I think, a new breakwater has been built since then.

The CHAIRMAN. On which side as you went in?

Captain MILLER. On the left-hand side as you go in, which protects it somewhat from easterly winds. At that time it was a very open roadstead, exposed to the wind from the north, and the strong winds in that region are what they call "northers."

Senator HANNA. How often do they occur?

Captain MILLER. They do not occur very often, but when they do come they come pretty lively.

Senator HANNA. Have you ever been there in a norther?

Captain MILLER. Never there; no, sir; but I have felt them up above there in Jamaica, and through that region, and we had to have two or three anchors down. But Colon is not a harbor in the sense of being large enough for many vessels, any more than Panama is, except for a long distance out from the shore. In Panama they will have to deepen the channel for a long distance from shore; in fact, I think they have already deepened it.

The CHAIRMAN. By harbor you mean a place where a ship can receive protection against the weather?

Captain MILLER. Yes.

The CHAIRMAN. But Colon is a place where trade is carried on?

Captain MILLER. Oh, yes; it is like Port Limon, which I have visited, and all those places along there. They have breakwaters built out, and more or less protection, but not what you would consider a good harbor.

The CHAIRMAN. You have no personal knowledge of what the ships have to do when these northers or these heavy waves come in, in the harbor of Colon?

Captain MILLER. I know that the Pacific mail steamers always go right into their dock, which is protected. Other vessels outside, I should imagine, would have to get under way; but I have not been there for many years, Senator.

The CHAIRMAN. In your knowledge of nautical affairs, in your reading of nautical affairs, what is the reputation of Colon as a safe harbor?

Captain MILLER. It is not good, sir. There have been a great many wrecks there.

Senator HANNA. Recently?

Captain MILLER. Yes; there was a very bad wreck there month before last. I think there was a Norwegian ship went to shore, and I think there were others had to get under way and get out.

Senator HANNA. Ships go ashore off Sandy Hook, do they not?

Captain MILLER. Yes, sir.

Senator HANNA. But New York is a good harbor, isn't it?

Captain MILLER. That is all right, after you get inside, Senator.

Senator HANNA. So with Colon, too.

Captain MILLER. There is no inside at Colon.

The CHAIRMAN. While you were in Nicaragua looking over this country and connected with the survey, did you personally go down the line of the survey that Lull made there?

Captain MILLER. Yes; we were examining the various routes on the west of the lake to see which was the best one. At that time there were a great many so-called best places, and we surveyed five different routes between the lake and the Pacific, getting down approximately to the route that has at last been accepted; that is, what is known as the Lajas and the Medio routes. Those two routes were recommended by the Lull survey. Then I was detailed for the hydrographic work on the San Juan River, which meant the party that was to do the sounding in the San Juan, the triangulations, and the levels from the lake down. I spent thirty-three days on that work. We took many thousand soundings, triangulated the river, and connected up with parties on shore which were running levels, so as to check our own levels.

The first 14 miles of that river was originally part of the lake, probably. Its banks are low and marshy. The set of the current and of the silt for centuries has made these marshes on either side. There was from 11 to 14 feet of water in the river along about that region.

Then you come to the mainland proper. The land begins to rise by terraces on each side as you go farther down; the current begins at the rate of about a half a knot an hour. You get down to the Toro rapids; quite an appreciable current. That is the first rapid. I do not like to give figures for I have not looked at it for so long, but it is quite a fall.

The CHAIRMAN. It is a fall over which vessels have been conducted?

Captain MILLER. Oh, yes; they took the steamers up and down there.

The CHAIRMAN. You would call it a rapid then, would you not?

Captain MILLER. Yes. Steamers go up and down, and they steam to a place called Castillo, just below the Toro rapids, and there they have to transfer their freight. Castillo has a high hill on either side, a very high hill on the southern side. There is an old fort there, and the river for half a mile runs over rocks, and there is quite a rapid. Below that you transfer to another steamer if you are going down. Then you come to deep water for some 8 or 9 miles until you reach another set of rapids through which the steamer goes, and it is a series of rapids there for about 3 miles, called the Machuca and Balas rapids. Steamers go through them. Then below that you come to 18 miles of dead water, where there is 90 feet of water in some places and nowhere less than 30, a ready-made canal except that it is rather narrow in some places.

That brings you down to the end of that 65 miles I was telling you about when we were coming up, and here is where the dam is proposed to be built.

The CHAIRMAN. And from that into Greytown it is canalization?

Captain MILLER. It is canalization; a level low land, with here and there a hill.

Senator HANNA. Who located that dam?

Captain MILLER. I was speaking in general terms of a dam.

Senator HANNA. You spoke of Mr. Menocal being the engineer of this expedition which you were a part of, and his plan upon which the Maritime Canal Company proceeded to work. Was that route adopted by the Commission in their report to the Government?

Captain MILLER. The Menocal route?

Senator HANNA. Yes.

Captain MILLER. Everything is about the same in all reports down through the "agua muerta" or dead water.

Senator HANNA. You mean coming from the west?

Captain MILLER. Coming from the west. From the west you come down, as I stated, and to what is known as the "agua muertas," or dead water. That is the real end of the river as an outlet to the lake.

Senator HANNA. And that route has been adopted by all engineers?

Captain MILLER. That route has been adopted by all engineers. Now, it is a question below there as to which is the best way to reach Greytown. There has been a difference of opinion on that. At that time we surveyed the route right along the river bank. That is the route this Commission has come back to.

The CHAIRMAN. That is the Lull survey?

Captain MILLER. That is the Lull survey. We surveyed a route right along the river.

Senator HANNA. But away from the river?

Captain MILLER. Oh, no; right along the river. That is approximately the route the Commission has come back to. Personally, I do not think that is the best. The route following the level land on the river banks is almost identical with the Lull route.

There was one other point I have neglected to state in speaking of the river. My party on the Lull survey spent thirty-three days on the San Juan. Our orders were to ascertain the amount of water that flowed, and we made a great many experiments to determine that. That was one of the two main points we had to determine. The other was the height to which the river had ever been, and we went back in the woods to ascertain that. It was the dry season, and there were nowhere any signs to show that the river was ever more than 6 feet above its then present level. Of course, in a tropical country you can mark the freshet line very closely on the trees.

The CHAIRMAN. More than how many feet?

Captain MILLER. More than 6 feet; and the lake at that time was 100 feet above the level of the ocean.

The CHAIRMAN. Above the mouth of the San Carlos did you find any place, in your examinations there, where the San Juan River was out of its banks at any time?

Captain MILLER. No, sir; there was nowhere where it could get out of its banks. It was a narrow ravine.

The CHAIRMAN. I supposed there might be some small margin over which it would overflow.

Captain MILLER. Nothing that it could overflow.

The CHAIRMAN. You adopt 6 feet, then, as the standard high water for the San Juan River?

Captain MILLER. I do. Voluminous notes, which ought still to be in existence, were made and detailed charts of the river appeared in the subsequent report which was made to the Government by Admiral

Ammen and General Humphreys. Before they made their report a special commission was sent down in the winter of 1873-74, of which commission I had the honor to be secretary. Major McFarland, of the Engineer Corps, was the senior officer of that. They also went over the Panama route and after their return reported to General Humphreys in favor of Nicaragua. The Government report is undoubtedly on file with your Commission.

Senator HANNA. Your experience in Panama was confined to crossing the Isthmus on the railroad?

Captain MILLER. Yes.

Senator HANNA. You never made any examination of the route for the canal?

Captain MILLER. Never.

Senator HANNA. You know nothing about the conditions there for the canal?

Captain MILLER. Nothing except from study. A gentleman who was chief of one of our parties in 1873 had just come back from Panama—all the naval officers who had surveyed both routes were in favor of Nicaragua.

Senator HANNA. I am not asking for hearsay testimony.

Captain MILLER. No, sir; I know nothing personally about the route, except Panama Bay. I know about that.

Senator HANNA. Well, I have heard about that.

Senator KITTREDGE. What was the aggregate stock issued by the construction company?

Captain MILLER. About \$12,000,000.

Senator KITTREDGE. And as I understand, Senator Morgan has a list of the stockholders of that company?

The CHAIRMAN. It is published in the record.

Senator KITTREDGE. And you have that list at the date of the insolvency or the reorganization of the construction company?

The CHAIRMAN. I do not know the date precisely. The full list is printed in the record.

Captain MILLER. As a matter of fact, this construction company has been in a dormant state for the last few years. We have all felt that the construction company was a thing of the past and that the Government was going to build the canal, and we were all busy men in other things, and I have not taxed my mind with the construction company's figures at all for the last two years.

Senator KITTREDGE. And you will send us a list of the stockholders and their places of residence at the present time?

Captain MILLER. Yes.

Senator KITTREDGE. Will you note such changes as may have occurred during the last two years in the list of stockholders?

Captain MILLER. Yes.

Senator KITTREDGE. Did your construction company ever issue any bonds?

Captain MILLER. No, sir; not the Nicaragua company.

Senator KITTREDGE. Did they become indebted in any way to anyone?

Captain MILLER. Oh, yes.

Senator KITTREDGE. Except, of course, such indebtedness as is incurred in the construction work.

Captain MILLER. No; I think not.

Senator KITTREDGE. Has it any debts outstanding at the present time?

Captain MILLER. Oh, yes; it owes the party of stockholders who put money in.

Senator KITTREDGE. I am speaking of the corporation proper.

The CHAIRMAN. Its floating debt.

Captain MILLER. Yes; we have a small floating debt.

Senator KITTREDGE. You say that a party of stockholders became indebted in the sum of \$20,000, as I recollect the amount.

Captain MILLER. Yes; I think that was the amount. The company was going to the wall and a party of us put our hands in our pockets and tried to keep the thing going.

Senator KITTREDGE. Who were those men?

Captain MILLER. I was one of them. I could give you a list of them. I have forgotten who they all were now.

Senator KITTREDGE. Will you put that all in when you get to New York?

Captain MILLER. It was a mere matter of trying to keep the canal going.

Senator KITTREDGE. Will you put a list of the stockholders or gentlemen who signed this note into your testimony?

Captain MILLER. Yes.

Senator KITTREDGE. Of what institution did you secure this loan?

Captain MILLER. I do not remember exactly how it was done. We had to get some one to back it.

Senator KITTREDGE. Who gave you the money on this note?

Captain MILLER. I think it was the Continental Trust Company.

Senator KITTREDGE. And was that note collateraled?

Captain MILLER. Yes.

Senator KITTREDGE. By what?

Captain MILLER. We put up some of the stock and bonds that the company owned.

Senator KITTREDGE. Issued by whom?

Captain MILLER. That came to the construction company from the Maritime Canal Company—securities they had in the treasury.

Senator KITTREDGE. How much money did the construction company realize from the issuance of its own stock?

Captain MILLER. I do not think it has ever issued anything. It was all the old company.

Senator KITTREDGE. So that since its reorganization no stock has been issued?

Captain MILLER. There has nothing been done. We reorganized, and started, but no work has been done since then.

Senator KITTREDGE. How much did the old company realize by the issuance of its stock?

Captain MILLER. I was not president of that company at that time. I do not know.

Senator KITTREDGE. Have you any means of giving that information?

Captain MILLER. I think I can find it.

The CHAIRMAN. We will have Mr. Atkins here tomorrow, and he can give us that.

Senator KITTREDGE. Did the new company acquire any actual property other than stocks and bonds?

Captain MILLER. Yes; the company acquired the property and plant of the original construction company which it operated in the work of construction.

Senator KITTREDGE. They hold that still?

Captain MILLER. Except that it is to go back to the Maritime Canal Company when the canal is finished.

The CHAIRMAN. By the new company you mean the new construction company?

Senator KITTREDGE. I mean the new construction company.

The CHAIRMAN. Everybody always gets those companies mixed.

Senator KITTREDGE. What property did the construction company acquire along the route of this canal?

Captain MILLER. It did not acquire anything.

Senator KITTREDGE. As I understood, you acquired property rights along the route of your canal.

Captain MILLER. We hold the work until the Maritime Company pays us finally for the work done, of course, but we have no equity, no deed and no right to it after the work is finished.

Senator KITTREDGE. What, if anything, did the Maritime Canal Company pay the construction company with which you are connected during the progress of the work?

Captain MILLER. There has been no work done since then. They have not paid us anything.

Senator KITTREDGE. What did it pay the old company?

Captain MILLER. It paid it in stock and bonds, and Mr. Atkins can give you the exact amount when he comes on here. I do not remember the exact amount.

Senator KITTREDGE. Have you knowledge of the amount realized by the construction company from the sale of the stock and bonds of the Maritime Canal Company?

Captain MILLER. That was before my day.

Senator KITTREDGE. And you have no knowledge of it?

Captain MILLER. No, sir; but the total amount raised and expended was between \$4,000,000 and \$5,000,000.

Senator KITTREDGE. Have you any knowledge of the extent, if at all, to which the officers and stockholders of the Maritime Canal Company were connected with the old construction company?

Captain MILLER. They never were connected except as stockholders.

Senator KITTREDGE. That is what I am getting at.

Captain MILLER. They never had any double office in both companies.

Senator KITTREDGE. Were the stockholders or directors in the Maritime Canal Company stockholders in the construction company?

Captain MILLER. Yes; I think they were.

The CHAIRMAN. Not all of them.

Captain MILLER. Not all of them, but some of them were. For instance, the construction company people got their stock, some of it, from the stock that came from the Maritime Canal Company, but most of it was held in the treasury.

Senator KITTREDGE. Did they not become stockholders in the construction company prior to any work being done by it in behalf of the Maritime Canal Company?

Captain MILLER. Well, I think they did, some of them. I do not remember now.

Senator KITTREDGE. Are you able to give the names?

Captain MILLER. I can not from memory.

Senator KITTREDGE. That is what I am getting at. Is it not a fact that the stockholders or directors of the Maritime Canal Company became stockholders in the construction company?

Captain MILLER. Yes; I think they did.

Senator KITTREDGE. Do you know to what extent?

Captain MILLER. No; I do not know to what extent; but the company had to be started in some way.

Senator KITTREDGE. Are you able to give that information?

Captain MILLER. I can look it up.

Senator KITTREDGE. I wish you would.

Captain MILLER. It was before I had anything to do with the office.

Senator KITTREDGE. Please give a statement from the records of the construction company.

Captain MILLER. I can come back here next week if you want me to.

Senator KITTREDGE. I do not think it is necessary. When you look these things up in New York, I wish you would ascertain the discount, if any, at which the stock and bonds of the Maritime Canal Company were sold by the construction company.

Captain MILLER. Yes.

Senator KITTREDGE. And the exact amount of stock and bonds issued by the Maritime Canal Company to the construction company on account of work done.

Captain MILLER. Very well.

The books of the Nicaragua company show that it owns the following securities of the Maritime Canal Company of Nicaragua:

Stock, Maritime Canal Company of Nicaragua.....	\$14, 672, 300
Bonds (scrip) Maritime Canal Company of Nicaragua.....	4, 850, 000
Maritime Canal Company's first mortgage bonds.....	84, 500
Total.....	19, 606, 800

The CHAIRMAN. Does the Maritime Canal Company owe the construction company anything except the bonds that it paid to the construction company for the work done.

Captain MILLER. No, sir; that is all it owes us. That is the contract.

The CHAIRMAN. Does the construction company look to the Government of the United States for any reimbursement whatever?

Captain MILLER. None whatever, sir. We have nothing to do with the Government. We look to the Maritime Canal Company.

Senator KITTREDGE. The Maritime Canal Company looks to the Government of the United States, as I understood your statement. Is that right?

Captain MILLER. As I said before, I am not an officer in that company. I should say, personally, as a shareholder——

Senator KITTREDGE. As a stockholder of the construction company?

Captain MILLER. Of both companies, I should say that I wanted to see the canal built, and I think everyone wants exactly the same thing. All we have done in that company is to keep the Nicaragua project before the people. We do not ask for anything except what the Government wants to give us.

Senator KITTREDGE. Still, they have a claim, as you understand it, which they perhaps would press against the United States.

Captain MILLER. We have spent \$4,500,000 in eighteen years of patriotic work for America and an American canal, and we think the Government ought to give it back to us.

Senator KITTREDGE. You think the Government ought to give you back the money you have spent, with interest?

Captain MILLER. Yes, sir; we think we ought to have that. Whether we get it or not depends on you gentlemen.

The subcommittee at 12.15 p. m. adjourned until Saturday, March 8, 1902, at 10.30 a. m.

List of stockholders of the Nicaragua Company, 1901.

Name.	Shares.	Address.
Anderson, estate of W. P.....	1,000	600 East Third street, Cincinnati, Ohio.
Armour, H. O.....	101	Produce Exchange, New York.
Atkins, Mrs. E. J.....	200	Roselle, N. J.
Ambler, J. P.....	6	Poughkeepsie, N. Y.
Ames, Olive.....	37	Boston, Mass.
Arcularius, P. E.....	15	104 West Forty-fourth street, New York.
Allison, W. O.....	18	72 Williams street, New York.
Allen, Charles C.....	5	2 Wall street, New York.
Archer, R. S.....	5	Richmond, Va.
Allison & Addison.....	327	Do.
Allison, William H.....	25	Do.
Allison, James W.....	25	Do.
Atkins, T. B.....	15	54 Broad street, New York.
Ames, Oliver 2d, and Samuel Carr, executor.	50	Boston, Mass.
Allen & Co., Henry.....	418	18 Wall street, New York.
Ammen, Daniel.....	170	Ammendale, Md.
Atkinson, Thos.....	12	Richmond, Va.
Alsop, B.....	6	Care J. L. Williams & Sons.
Agar, John G.....	50	32 Nassau street, New York.
Aldigé, Georges.....	115	New Orleans, La.
Aldigé, Jules.....	117	Do.
Aldigé, J.....	15	Do.
Aldigé, Mrs. Franz Hindermann.....	93	Do.
Arias, A. S.....	222	Care Munoz & Espriella, 61 Liberty street, New York.
Ammen, Eva.....	3	Ammendale, Md.
Ammen, Mathilde.....	3	Do.
Bartlett, Chrm. J. R.....	182	2 Wall street, New York.
Bartlett, John R.....	1,401	Do.
Bryan, Joseph.....	114	Richmond, Va.
Bryan, Joseph, executor.....	40	Do.
Borden, M. C. D.....	151	117 Duane street, New York.
Bartlett, and others, trustees.....	60,050	
Burger, W. H.....	18	7 Nassau street, New York.
Bates, Henry H.....	27	McGill Building, Washington, D. C.
Brown, Samuel N.....	60	42 Pearl street, Boston, Mass.
Bell, E. R.....	10	50 West Twenty-first street, New York.
Beltramini, J.....	26	108 Leonard street, New York.
Bush-Brown, H. K.....	34	Newburg, N. Y.
Baker, George S.....	1	Commercial Bank Building, Chicago, Ill.
Bolling, Chas. E.....	5	Richmond, Va.
Bolling, Stanhope.....	100	Care Lancaster & Lucke.
Blackwell, Emily.....	3	712 Macon street, Brooklyn, N. Y.
Boykin, F. M.....	5	Box 200, Richmond, Va.
Branch & Co., C. W.....	100	Richmond, Va.
Brokaw, De Witt.....	1	19 John street, New York.
Burleigh, H. G.....	38	Whitchall, New York.
Bernheimer, M.....	5	704 North Second street, St. Louis, Mo.
Brown, Richard L.....	27	Richmond, Va.
Bowe, N. W.....	20	Do.
Blair, J. Harvie.....	5	5 East Broad street, Richmond, Va.
Bigelow, S. C.....	5	510 California street, San Francisco, Cal.
Bloodgood, Julia C.....	3	Care J. Bloodgood & Co., 15 Broad street, New York.
Braine, Clinton E.....	10	Care Continental Trust Co.
Beales, Jas. A. G.....	2	Care Eugene J. Beales, 13 William street, New York.
Beales, Eugene J.....	2	Do.
Beales, Louisa S.....	2	Do.
Bell, Henry.....	2	39 Fitz Johns avenue, Hampstead, England.
Bosher, R. S.....	17	Care T. C. Williams & Co., Richmond, Va.
Bugbee, James H., administrator es- tate of John E. Bugbee.	5	Providence, R. I.
Bevin, L. A., executor.....	5	87 South Fifth avenue, New York.
Billings, estate of Frederick.....	280	120 Broadway, New York.
Bennett, F. W.....	17	Cape May, N. J.
Barker, John.....	127	Care Morton Bliss & Co.
Bode, Wm. A.....	1	Orange, N. J.
Bevier, P. H.....	21	545 St. Marks avenue, Brooklyn, N. Y.
Barns, Grace M.....	5	324 West Twenty-seventh street, New York.
Bransford, J. F.....	10	601 East Grace street, Richmond, Va.
Ball, J. M.....	3	Savings Bank of Richmond, Va.
Barnes, Pearce.....	5	49 Nassau street, New York.
Baker, Jennie B.....	4	Poughkeepsie, N. Y.
Bliss, Hon. Cornelius N.....	25	117 Duane street, New York.
Barroll, B. C., jr.....	25	Central Building, Liberty street, New York.
Brownson, U. S. N., Capt. W. H.....	308	Care R. A. Roberts, Yonkers, N. Y.
Brownson, Mrs. Isabella K.....	75	Do.
Beal, Eleanor J.....	5	Keene, N. H.
Blair, Walter.....	10	Hampden Sydney College, Va.
Brushaber, F. W.....	10	Care Continental Trust Company.
Barton, Annie A. and others Trsts.....	1	1122 California street, San Francisco, Cal.
Baldwin, F. H.....	600	Cincinnati, Ohio.
Blackwell, Samuel.....	5	Care Western National Bank, Brooklyn

List of stockholders of the Nicaragua Company, 1901—Continued.

Name.	Shares	Address.
Brega, C. W.	300	The Rookery, Chicago, Ill.
Brooks, Mrs. Ellen Fairbanks	197	Care D. Dean Patterson, St. Johnsbury, Vt.
Bergstresser, C. M.	68	Broad street, New York.
Baker Est. Co.	25	2156 Broadway, New York City.
Central Trust Company	5,426	54 Wall street, New York.
Coats, Archibald	400	Woodside Paisley, Scotland.
Clark, William	200	16 Montgomery Crescent, Glasgow, Scotland.
Cox, J. E.	13	Richmond Va.
Christian, E. D.	50	Do.
Christian, A. H., jr.	10	Do.
Cragin, E. F.	25	Room 907, 71 Broadway, New York.
Cheney, estate of A. C.	144	Care A. S. Cheney, Poughkeepsie, N. Y.
Converse, E. C.	10	26 Cortlandt street, New York.
De Cordova, Mathilde	2	Hotel Endicott, New York.
Culver, Helen	155	614 West Lake street, Chicago.
Crocker, H. J.	75	568 California street, San Francisco, Cal.
Crawford, J. A.	5	Columbia, S. C.
Cutting, Walter, executor estate of R. L. Cutting.	43	19 William street, New York.
Capen, C. H.	50	East Twenty-third street, New York.
Crane, A. B.	50	41 Wall street, New York.
Di Cesnola, L. P.	50	107 West Fifty-seventh street, New York.
Craig, J. A.	15	335 Greenwich street, New York.
Cocke, Preston.	1	Richmond, Va.
Christian, W. H.	8	Richmond, Va.
Cox, Chas. W.	20	3 Broad street, New York.
Crane, E. J.	5	Care B. Hayden, 107 Chambers street, New York.
Casey, Sophis G.	2	Care Capt. Silas Casey, Brooklyn Navy-Yard, New York.
Carrington, Mrs. M. L.	1	Care R. A. Lancaster, Richmond, Va.
Crosby, Pierce	18	1718 Connecticut avenue, Washington, D. C.
Crosby, Louise A.	37	Do.
Crowninshield, U. S. N., Admiral A. S.	109	Navy Department, Washington, D. C.
Cochran, Wm. F.	5	Yonkers, N. Y.
Camak, Miss M. A.	30	Care R. R. Lancaster & Sons, 10 Wall street, New York.
Carson-George, Mrs. J. R.	50	106 Chestnut street, Springfield, Mass.
Cook, Walter H., tutor.	93	345 Carondelet street, New Orleans, La.
Dietz, Caroline	5	81 New street, New York.
Darling, E. A., executor.	817	Fifth Avenue Hotel, New York.
Darling, E. A.	60	Do.
Davol, Joseph	1	Care Sheldon Binney, Providence, R. I.
Davenport, Frank A.	25	Care J. L. Williams & Sons.
Davenport, Isaac	5	Do.
Downing, Wellington	6	Erie, Pa.
Daly, Hoyt & Mason.	135	11 William street, New York.
Daly, C. P.	494	Do.
Dutard, H.	1	125 Davis street, San Francisco, Cal.
Dunn, John.	5	1 Park Row, Chicago, Ill.
Doyle, John T.	5	Menlo, Cal.
Dearborn, D. B.	45	22 Beaver street, New York.
Davis, G. W.	108	Care Adjutant-General, Washington, D. C.
Dominick, G. F.	100	74 Broadway, New York.
Donohue, estate of J. A.	4	Care E. Kelly & Co., Temple court, New York.
Duckworth, J. B.	23	Savannah, Ga.
Dunham, B. F.	12	Care B. Hayden, 107 Chambers street, New York.
Day, Henry P.	25	Seymour, Conn.
Daniel, Hallie W.	1	Care J. L. Williams & Sons.
Donaldson, W. R.	38	207 Temple Building, St. Louis, Mo.
Dunlop, Bessie L. C.	5	Richmond, Va.
Dulin, Caroline S.	9	107 Monument street, Baltimore, Md.
Dulin, Mary Bowie.	16	Do.
Dulin, Caroline V.	9	Do.
Dubois, F. N.	10	245 Ninth avenue, New York.
Doe, C. F.	5	General post-office, New York.
Doe, B. & C. F., executors.	5	Do.
Dunham, Clarke	10	Care Latham, Alexander & Co., 10 Wall street, New York.
Emery, J. J.	1	5 East Sixty-eighth street, New York.
Edwards, R. L.	1	35 William street, New York.
Einstein, H. L.	100	Boundbrook, N. J.
Ehrman, M., & Co.	5	San Francisco, Cal.
Ellerson, A. R.	5	Care Lancaster & Lucke.
Ellerson, Jas. R.	51	605 Fourteenth street NW., Washington, D. C.
Eastman, Joseph	2	25 Pine street, New York.
Eastman, L. P.	2	Tarrytown, N. Y.
Ellerson, Mrs. Ida W.	43	Care J. L. Williams & Sons.
Frank & Cooper	100	45 Broadway, New York.
Fairbank, N. K.	835	Chicago, Ill.
Fish, Stuyvesant	21	214 Broadway, New York.
Fisher, Chas. D.	305	Baltimore, Md.
Flagler, H. M.	10	26 Broadway, New York.

List of stockholders of the Nicaragua Company, 1901—Continued.

Name.	Shares.	Address.
Franklin, S. R.....	1	Metropolitan Club, Washington, D. C.
Franks, R. A., trustee	8	Carnegie Steel Company, Pittsburg, Pa.
French, Martha E.....	6	614 West Lake street, Chicago, Ill.
Fenner, H. N.....	5	Care N. E. Butt & Co., Providence, R. I.
Feusler, Louis.....	5	San Francisco, Cal.
French, Ellen T.....	30	Manhattan Trust Company.
Foster, Samuel.....	1	26 California street, San Francisco, Cal.
Fink, Henry	50	Knoxville, Tenn.
Franklin, P. A. S.....	1	4 Broadway, New York.
Farmers Loan and Trust Company, custodian.	50	22 William street, New York.
de la Forest-Divonne, Comte Louis ...	100	Care J. P. Morgan & Co., New York.
Fairbanks, Mary E.....	394	D. Dean Patterson, St. Johnsbury, Vt.
Flinsch, Rudolf E. F.....	40	54 Wall street, New York.
Greason, William	2	182 Broadway, New York.
Garth, D. J.....	15	Scarsdale, N. J.
Garson, K. S.....	11	40 New street, New York.
Gullbert, Edmond	10	Southport, Conn.
Guilbert, Minnie I.....	8	Do.
Gilliam, Marshall M.....	67	1111 Main street, Richmond, Va.
Garrett, T. Harrison, estate	319	Care Robert Garrett & Son, Baltimore, Md.
Garrett, Mary F.....	535	11 Mount Vernon place, W. Baltimore, Md.
Garrett, John W.....	179	11 South street, Baltimore, Md.
Garrett, Robert	72	Do.
Garrett, Charlotte D.....	72	Do.
Greely, C. S.....	5	Wainsworth Building, St. Louis, Mo.
Gelshenen, W. H.....	23	Garfield National Bank, New York.
Gordon, J. W.....	2	Care J. L. Williams & Sons.
Gale, Thos. N.....	1	1324 F street NW., Washington, D. C.
Greene, Mary E.....	10	Care A. H. Smith & Co., Broadway and Maiden Lane, New York.
Grosvenor, J. B. M.....	380	62 William street, New York.
Gordon, Basil B.....	22	Richmond, Va.
Hitchcock, Hiram	2, 156	Fifth Avenue Hotel, New York.
Howland, Henry E.....	158	35 Wall street, New York.
Hotchkiss, Mrs. Clara T.....	692	Mamaroneck, N. Y.
Hawk, W. S.....	100	571 Fifth avenue, New York.
Howe, J. K.....	50	Albany, N. Y.
Holbrook, Edward	300	Nineteenth street and Broadway, New York.
Hoyt, Alfred M.....	500	1 Broadway, New York.
Henderson, Norman.....	10	64 Cedar street, New York.
Hotchkiss, Margaret M.....	100	Care W. Mynderse, 54 Wall street, New York.
Herbert, W. F.....	21	New Pier 36, North River, New York.
Hanewinckel, F. W.....	12	Care J. L. Williams & Sons.
Hutchinson, Geo.....	5	31 Bedford street, Boston.
Hotchkiss, Miss M. L.....	11	Plainfield, N. J.
Hopkins, Woolsey R.....	5	Stamford, Conn.
Haxall, Barton.....	5	Care J. L. Williams & Sons.
Hanewinckel, E.....	12	Do.
Harvey, J. G.....	102	715 Washington place, Baltimore, Md.
Honegger, Theo.....	4	8 Abingdon square, New York City.
Hentz, Henry	87	22 William street, New York.
Hammond, estate of John L.....	165	Savannah, Ga.
Hoyt, Henry R.....	250	11 William street, New York.
Hatch Bros.....	1	66 Broadway, New York.
Hills, Thos. O.....	10	1321 New York avenue, Washington, D. C.
Hall, Jas. S.....	13	Ore Bank, Buckingham County, Va.
Harris, A. T.....	50	Richmond, Va.
Hanewinckel, Emilie	14	Care I. O. Packard, Baltimore, Md.
Hartley, H. J.....	5	1624 Oxford street, Philadelphia, Pa.
Hough, Marietta S.....	10	Care A. H. Smith & Co., Broadway and Maiden Lane, New York.
Haskins, Mrs. M. R.....	25	80 Broadway, New York.
Haskins, Chas. H.....	25	Do.
Hall, H. C.....	15	Millbury, Mass.
Hilliard, J. B.....	50	65 Renfield street, Glasgow, Scotland.
Highet, Chas. I.....	35	14 Bothwell street, Glasgow, Scotland.
Highet, John, M. D.....	600	Workington, England.
Highet, Thos. C.....	35	14 Bothwell street, Glasgow, Scotland.
Hooper & Co., C. A.....	25	San Francisco, Cal.
Hayden, Brace	27	107 Chambers street, New York.
Hodgson, R. H.....	17	Western Lodge, Workington, England.
Hinderman, Mrs. F.....	22	Care Georges Aldige, New Orleans, La.
Henry, Louise D.....	16	107 Monument street, Baltimore, Md.
Hopewell, John R.....	5	Boston, Mass.
Handren, Miss M. S.....	5	192 Cumberland street, Brooklyn, N. Y.
Haldane, Mary H.....	2	166 West Fifty-fifth street, New York.
Hall, R. C.....	50	36 South Halliday street, Baltimore, Md.
Haxall, J. Triplett.....	5	Richmond, Va.
Harwood, R. H.....	10	Care of Lancaster & Lucke.
Holbrook, Merrill & Stetson.....	75	256 Broadway, New York.
Hunter, Mrs. F. O'Driscoll.....	50	Care of J. F. Minis & Co., Savannah, Ga.

List of stockholders of the Nicaragua Company, 1901—Continued.

Name.	Shares.	Address.
Herriek, Mrs. Mary F	197	Care of D. Dean Patterson, St. Johnsbury, Vt.
Heywood, Alfred	10	Phoenix Building, Harrington street, Liverpool, England.
Hill, Mary C.	13	Care Jas. Bleecker & Son, 156 Broadway, New York
Hotchkiss, Horace L.	23	35 Broad street, New York.
Halsey & Hudnut.	30	11 Wall street, New York.
Howard, Robert R.	1	Care of G. E. P. Howard, 32 Liberty street, New York.
Illinois Central R. R. Co	5	214 Broadway, New York.
Inglis, W. G.	32	6 Craigleair Terrace, Ayr, Scotland,
Inglis, John & Chas. D	12	Care Bank British North America, New York City.
Inglis, David.	20	Care Brown Bros. & Co., New York.
Iselin, A. & Co	2	New York City.
Jackson, Sir John	200	3 Victoria street, Westminster, London SW., England.
Jackson, L. L.	50	Baltimore, Md.
James, Henry A.	50	35 Wall street, New York.
Jones, Washington	1	1632 North Fifteenth street, Philadelphia, Pa.
Jeffress, Thos. F.	14	Richmond, Va.
Joost, Behrend.	14	1438 Mission street, San Francisco, Cal.
De Johnson, Elvira L	12	The Portland, Washington, D. C.
Judson & Co., H. I	172	7 Nassau street, New York.
Kelly, Edward	7	Temple court, New York City
Keith, O. P.	1	85 Somer street, Brooklyn, N. Y.
Knox, T. T.	75	Fort Grant, Ariz.
Koch, J. Otto.	1	16 Beaver street, New York.
Kraetzer, A. G., jr.	17	251 Marcy avenue, Brooklyn, N. Y.
Kenyon, J. S.	1	Care Edward P. Sheldon & Co., Providence, R. I.
Kaine, G. J. and others, tr	13	St. Louis Trust Co., St. Louis, Mo.
Koch, Mrs. James P.	116	Care Georges Aldige, New Orleans, La.
Kimball & Co., R. J	100	16 Broad street, New York.
Kellogg, L. Lafin	133	120 Broadway, New York.
Kennedy, E. W.	100	International Paper Co., 30 Broad street, New York.
Kessler & Co.	5	54 Wall street, New York.
Kingsley, Mrs. Jennie T.	29	105 Grove street, New Haven.
Kelly, Eugene, and others, trustees.	53	Temple Court, New York City.
Do.	17	Do.
Lennox, Miss Elizabeth	200	The Grange, Sunderland, England.
Lovell, Mrs. Nannie Gordon	22	Care Lowndes & Redwood, Baltimore, Md.
Linsley, Elizabeth D.	2	Metuchen, N. J.
Lozier, Mrs. Sarah J.	53	326 Richmond Terrace, New Brighton, N. Y.
Leigh, C. J.	2	299 Lexington avenue, New York.
Ladd, Herbert W.	1	Industrial Trust Co. Building, Providence, R. I.
Liebes & Co., H	2	San Francisco, Cal.
Lancaster & Lucke	58	Richmond, Va.
Lucke, W. H.	11	Do.
Lancaster, R. A.	416	10 Wall street, New York.
Lancaster, R. A., jr	41	Richmond, Va.
Lancaster, John A	48	Do.
Lancaster, Edwin R.	95	10 Wall street, New York.
Lancaster, E. W.	149	Do.
Lancaster, N. D	53	Do.
Lancaster & Sons, R. A	3	Do.
Langley & Michaels Co	20	San Francisco, Cal.
Life Insurance Co. of Va.	12	Richmond, Va.
Ladenburg, Thalman & Co	14	44 Wall street, New York.
Lange, Mrs. H.	93	Care of J. F. O'Shaughnessy, 85 Wall street, New York.
Miller, Warner.	1111	30 Broad street, New York.
Miller, J. W.	401	New Pier 19, North River, New York.
Mason, A. T.	52	11 William street, New York.
Miller, S. C.	201	White Plains, New York.
Mailler, W. H.	6	35 Stone street, New York.
Miller, Hoffman.	10	80 Broadway, New York.
Mynderse, W.	50	54 Wall street, New York.
Moss, H. O.	28	New Berlin, New York.
Massachusetts National Bank.	24	Boston, Mass.
Morris, Junius A.	12	Care of J. L. Williams & Sons.
Massie, Eugene C., executor.	2	Do.
Massie, Eugene C.	5	Do.
Matlack, David J.	5	Port Richmond Iron Works, Philadelphia, Pa.
Moore, Warner	25	Richmond, Va.
Magerhans, A. W.	3	19 John street, New York.
Mason, Jas. B.	25	Baltimore, Md.
Mason, Samuel C	25	Care Jas. D. Mason.
Murphy, Grant & Co.	7	86 Worth street, New York.
Mook, Thos.	150	204 Produce Exchange, New York.
Macauley, estate of J. L	40	Care F. E. Parker, 35 William street, New York.
Macauley, A. J.	5	Do.
Munoz, Leontine C	31	61 Liberty street, New York.
Mattlage, Chas. F.	25	335 Greenwich street, New York.
Mattlage, C. Henry	13	Do.
Mattlage, George F.	50	335 Greenwich street, New York.

List of stockholders of the Nicaragua Company, 1901—Continued.

Name.	Shares.	Address.
Miller & Lux	1	San Francisco, Cal.
Moser, Max	2	Wilksburg, Pa.
Medina, J. F.	152	Care Lazard Freres, 10 Wall street, New York.
Muller, Frederick	1	54 Wall street, New York.
Muller, Carl	1	Do.
Mootry, Thos.	5	508 California street, San Francisco, Cal.
Motley, T. N.	200	43 John street, New York.
Meredith, W. R.	10	Care J. L. Williams & Sons.
Meade, R. H.	10	Box 414, Richmond, Va.
Munroe, Benjamin F.	100	80 Broadway, New York City.
Mason, W. L.	2	Keene, N. H.
Montague, J. J.	73	Ninth and Arch streets, Richmond, Va.
Minis & Co., J. F.	101	Savannah, Ga.
Moller, P. E.	1	3 West Thirteenth street, New York.
Miller, Elizabeth B.	1	202 West Jersey street, Elizabeth, N. J.
Miller, Henry Wise	100	Care J. W. Miller, Pier 19, North River, New York.
Marquand & Parmly	80	160 Broadway, New York.
MacDonald, Chas.	19	160 West Seventy-eighth street, New York.
Macdonald, Gordon	14,986	30 Broad street, New York.
McCanliss, J. J.	100	Care H. I. Judson & Co., 7 Nassau street, New York.
McMullen, Jas. H.	124	Bliddeford, Me.
McGuire, F. B.	21	1419 G street NW., Washington, D. C.
McGuire, Emily N.	1	Do.
McKerrow, Dr. George	125	Barnes street, Ayr, Scotland.
McCormick, Cyrus H.	25	329 Wabash avenue, Chicago.
McGregor, Adam	25	Barnes terrace, Ayr, Scotland.
McGuire, F. H.	15	Richmond, Va.
McKittrick, H., estate of	5	
Morris, John T.	15	
Munoz & Espriella	93	61 Liberty street, New York.
Monteagle, Louis F.	2	530 California street, San Francisco, Cal.
Newton, Virginus	10	Box 206, Richmond, Va.
Nicoll, H. D., M. D.	50	51 East Fifty-seventh street, New York.
Nelson, L. C.	12	St. Louis, Mo.
Nelson, Regina	15	Care J. L. Williams & Sons.
O'Brien, E. C.	1	Pier A, North River, New York.
Orthwein, C. F.	5	126 Laclede avenue, St. Louis, Mo.
Oppenshaw, Lieut. Col. F. O. S.	60	17 Revaly road, Colchester, England.
O'Shaughnessy, J. F.	100	35 Wall street, New York.
O'Connor, Thos. H.	2	16 Exchange place, New York.
Oelrichs, Hermann	5	15 Broadway, New York.
Pierce, Henry D.	101	Indianapolis, Ind.
Potts, Thos.	57	Richmond, Va.
Pemberton, T. Wm.	66	1301 East Main street, Richmond, Va.
Plankinton, Mrs. Elizabeth A.	25	Care John Johnston, Milwaukee, Wis.
Picking, estate of H. F.	9	Erie, Pa.
Pope, Wm. H.	5	Care of Sheldon & Binney, Providence, R. I.
Phlipps, Henry, jr.	2	Carnegie Steel Company, Pittsburg, Pa.
Palmer, Mrs. Ellen R.	10	1321 Carey street, Richmond, Va.
Palmer, Wm. H., jr.	400	Richmond, Va.
Pope & Talbot	12	San Francisco, Cal.
Poor, R. W.	50	Garfield National Bank, New York.
Provand, A. D.	10	2 Whitehall court, London, England.
Price, Wm. A.	2	Care of Lancaster & Lucke.
Popper & Stern	25	19 New street, New York.
Parrott, Mrs. Abbie M.	125	Care of Montgomery Godly, 414 Montgomery street San Francisco, Cal.
Patton, John M.	100	Care J. L. Williams & Sons.
Price, B. E. L.	10	Care Lancaster & Lucke.
Pleasants, James	20	Richmond, Va.
Phelan, J. J.	18	Post Building, Exchange place, New York.
Pegram, J. W.	5	Care J. L. Williams & Sons.
Peck, W. A.	1	32 Custom House street, Providence, R. I.
Pitkin, Ellen F.	12	Woodstock, Vt.
Pullman, estate of Geo. M.	50	15 Broad street, New York.
Peaslee, E. H.	58	29 Madison avenue, New York.
Pope, Geo.	12	
Peary, Mrs. Josephine D.	25	Care Central Trust Company, New York.
Palmer, Wm. H.	100	Richmond, Va.
Parnell, estate of D. T. S.	12	Care R. L. Harrison, 59 Wall street, New York.
Parsons, Geo. B.	10	
Parr, Henry A.	521	Baltimore, Md.
Quereau, F. W.	2	35 Stone street, New York.
Roosevelt, estate of James	639	Hyde Park, New York.
Robinson, Geo. H.	525	15 Cortlandt street, New York.
Rutherford, John	7	Care J. L. Williams & Sons.
Rehorn, Eunice	25	235 East Eighteenth street, New York.
Rehorn, Carrie W.	10	Do.
Rich, Isaac, Sarah E. Hussey, and Henry Rich.	57	Somerville, Mass.
Russell, Thos.	12	1213 Pennsylvania avenue, Washington, D. C.
Rockwood, W. H.	5	20 Union square, east, New York.

List of stockholders of the Nicaragua Company, 1901—Continued.

Name.	Shares.	Address.
Rowland, William.....	16	Care Farmers' Loan and Trust Company, 22 William street, New York.
De Ruyter, John.....	1	75 Madison avenue, New York.
Rathbone, R. Bleecker	10	187 Broadway, New York.
Randolph, Norman V	43	Richmond, Va.
Riely, J. W.	10	Care Lancaster & Lucke.
Rogers, Egerton S	3	Do.
Richardson, Mrs. M. Grace.....	115	17 West Seventy-fourth street, New York.
Schieffelin, Jos. T.....	10	318 West Twenty-ninth street, New York.
Sibley, E. K.	1	160 Broadway, New York.
Smith, Frank E.....	1	21 Cortlandt street, New York.
Spencer, W. C.....	25	899 Broadway, New York.
Speir, Gilbert M., jr	50	62 Wall street, New York.
Simpson, J. B.....	250	97 Fifth avenue, New York.
Sterling, J. H.....	5	80 Broadway, New York.
Skinner, John H	100	20 William street, New York.
Sweet, Jos. L.....	17	Attleboro, Mass.
Scribner, G. Hilton.....	100	Yonkers, N. Y.
Smith, estate of Marcellus	6	Richmond, Va.
Smith, Miss Ella T	5	Hagerstown, Md.
Seward, Wm. H.....	51	Auburn, N. Y.
Skelton, Julian F.....	1	Va. F. and M. Ins. Co., Richmond, Va.
Seddon, W. C.....	5	Baltimore, Md.
Sheard, Titus.....	50	Little Falls, N. Y.
Shwartz, M.....	5	Poughkeepsie, N. Y.
Sweetland, C. S.....	1	Providence, R. I.
Sheldon, C. H., jr.....	1	Do.
Stumpf, Theo. F.....	13	115 Worth street, New York.
Sturgis, estate of Robert.....	10	1 Nassau street, New York.
Stevens, Miss C. Augusta.....	115	17 West Seventy-fourth street, New York.
Shepard, Augustus D	172	86 Trinity place, New York.
Sloss, Louis & Co.....	75	San Francisco, Cal.
Spring, J. R.....	5	Care Louis Sloss & Co.
Sears, Joseph	250	301 Tacoma Building, Chicago, Ill.
Studebaker Brothers Manufacturing Co.	2	South Bend, Ind.
Smith & Co., Alfred H.....	80	Broadway and Maiden lane, New York.
Spreckels & Brothers Co., J. D	75	San Francisco, Cal.
Sloan, B. B.....	68	22 William street, New York.
Soper, A. W.....	13	160 Broadway, New York.
Steinhart, Wm.....	5	1091 Post street, San Francisco, Cal.
Stebbins, Minnie V	445	Care S. W. Knevals, 34 Nassau street, New York.
Smith, Theodore	11	West Essex street, Jersey City.
Shall, William, jr.	1	54 Wall street, New York.
Shannon, R. C.....	150	10 West Fiftieth street, New York.
Smith, Arthur A	1	122 California street, San Francisco, Cal.
Sibley, Ellen W.....	75	Care of Marquand & Parmly, 160 Broadway, New York.
Slavin, H. B.....	69	66 Broadway, New York.
Steers, Mary D	2	Care of Eugene J. Beales, 13 William street, New York.
Steers, M. D., as guardian of John C. Beales.	2	Do.
Steers, M. D., as guardian of Henry de Soto Beales.	2	Do.
Sedgwick, Adelaide E.....	2	
Sedgwick, Margaret J.....	2	
Stevens, Henry D.....	50	Care of Hunter, Pearce and Battey, 106 East Bay street, Savannah, Ga.
Spencer, Emily M. R.....	462	Care of Winslow, Lanier & Co., 17 Nassau street, New York.
Thompson, William H.....	200	120 Broadway, New York.
Thomas, Samuel.....	10	80 Broadway, New York.
Taylor, D. M.....	13	Augusta Arsenal, Ga.
Tone, T. Wolfe.....	50	18 Wall street, New York.
Thomas, William P.....	5	Port Richmond Iron Works, Pittsburg, Pa.
Taylor, R. E.....	2	Care of Riggs & Co., Washington, D. C.
Treadway, T. J.....	2	Whitehall, N. Y.
Tingley, S. H.....	1	Care of Sheldon, Binney & Co., Providence, R. I.
Talcott, T. M. R.....	2	Care of Lancaster & Lucke.
Thyarks, H. W.....	14	Care Joest Bros., San Francisco, Cal.
Taylor, Virginia S	24	Poughkeepsie, N. Y.
Tatum, Lucian B.....	20	Richmond, Va.
Trigg, W. R.....	42	Do.
Thurston, J. S.....	50	Banking Department, Albany, N. Y.
Tittamer, Henry	8	Poughkeepsie, N. Y.
Taylor, C. L.....	5	428 California street, San Francisco, Cal.
Treat, C. P.....	625	The Rookery, Chicago, Ill.
Thorn, Samuel, and others, trustees....	20	45 William street, New York.
Tauseig, Ellen K.....	40	Const. Survey Office, Washington, D. C.
Taylor, Henry C.....	338	Brooklyn Navy-Yard.
Tauseig, William	5	St. Louis, Mo.

List of stockholders of the Nicaragua Company, 1901—Continued.

Name.	Shares.	Address.
Tichenor, A. R	15	Washington, D. C.
Thompson, F. F	590	First National Bank, New York.
Taylor, Blair D	5	Care of R. A. Lancaster & Sons, 10 Wall street, New York.
Tag, Casimir	30	17 Broad street, New York.
Tabb, Miss Katherine V	5	Care of Herbert W. Brune, Baltimore, Md.
Unckles, Thos. H	25	34 Cliff street, New York.
Ubsdell, J. A	11	Port Eads, La.
Urquhart, E	175	Care of Marquand & Parmly, 160 Broadway, New York.
Von Lingen, G. A	50	Box 892, Baltimore, Md.
Vilas, Chas. N	60	Fifth Avenue Hotel, New York.
Vietor, Adolph	3	51 William street, New York.
Van Zant, Frederick	7	Hackensack, N. J.
Valentine, Herbert	10	38 Park row, New York.
Vietor, E. K	2	Richmond, Va.
Winter, Emil J	371	Care H. L. Hotchkiss, 35 Broad street, New York.
Winter, E. J	43	Do.
Weed, S. M	128	21 Cortlandt street, New York.
Wheeler, Jane H	10	Care E. S. Wheeler, Niagara Falls, N. Y.
Williams, John L. & Son	400	Richmond, Va.
Williams, Robert F	10	Care J. L. Williams & Sons.
Williams, Jeremiah	10	105 Federal street, Boston, Mass.
Wilson, Nathaniel	200	622 F street, Washington, D. C.
Williams, estate T. C	115	Richmond, Va.
Williams, T. C., jr	22	Do.
Wetherbee, Gardner	200	Manhattan Hotel, New York.
Wyeth, John A	7	19 West Thirty-fifth street, New York
Williams, E. Victor	50	Care Lancaster & Lucke.
Wilbur, John W	70	Do.
Wight, Eben	7	1168 Broadway, New York.
Williams, Abram	10	2834 Prairie avenue, Chicago, Ill.
Wyckoff, E. Anna	10	The Spofforth, Stamford, Conn.
Wheelwright, T. S	2	Care C. W. Branch & Co., Richmond, Va.
Wendt, Bernard	5	23 Green street, New York.
Williams, Mrs. J. H	20	Care H. L. Hotchkiss, 35 Broad street, New York.
Williams, John L., & Sons	478	Richmond, Va.
Whittier, W. F	50	San Francisco, Cal.
Williams, Geo. B	20	Walpole, N. H.
Walker, G. A	2	Care of J. L. Williams & Sons.
Walker, Jno. G	2	Do.
Walker, Annie R	5	Do.
Walker, William J., guardian, etc	50	Do.
Watkins, Virginia R., executrix	5	38 Wall street, New York.
Wood, Heustis & Co	5	New York City.
Wallace, S. G	2	Richmond, Va.
Young, Mrs. Sophie D	500	Care of J. H. Young, Mills Building, New York.
Young, T. S., jr	1	66 Broadway, New York.
Young, Robert	50	Empire Theatre, New York.
Young, Wm. H	30	
Zborowska, Anna Elliott Morris Com- tesse de Montsaulain.	100	Care J. P. Morgan & Co., Broad and Wall streets, New York.
Total	120,000	

I hereby certify that the foregoing is a correct list of the stockholders of the Nicaragua Company, and of their respective holdings of the stock of the company, as it appeared of record upon the books of the company on the 1st day of February, 1901, and that no transfers of said stock have been made since the said 1st day of February.

New York, February 21, 1901.

EDWIN R. LANCASTER,
Secretary.

STATEMENT

OF

REAR-ADMIRAL J. G. WALKER,

BEFORE THE

COMMITTEE ON INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Friday, February 7, 1902.*

The committee met at 11 o'clock a. m. .

Present: Senators Morgan, chairman; Harris, Mitchell, Kittredge, Millard, Hawley, and Hanna.

Admiral J. G. WALKER appeared and was duly sworn by the chairman.

STATEMENT OF ADMIRAL J. G. WALKER.

The CHAIRMAN. Now, Senator Harris, as you suggested that the members of the Isthmian Canal Commission be brought before this committee, I will ask you to conduct the examination.

Senator HARRIS. I have not a great many questions to ask, but I suppose every one will have a right to ask any questions he may desire?

The CHAIRMAN. Yes, of course.

Senator HARRIS. In this last report, Admiral, which was made by the Commission, there are a number of considerations or suggestions involved in the transfer of the Panama property and rights, somewhat similar to the considerations that were mentioned a little more fully in your preliminary report, you remember, that you made in November.

Admiral WALKER. Yes.

Senator HARRIS. It gives very fully, goes over very fully, the different legal, financial, and diplomatic difficulties involved in taking over the Panama property.

Admiral WALKER. Yes.

Senator HARRIS. And in the final report which you have made, the last report, as I understand it, your recommendations practically become additional recommendations, based upon all these other difficulties which you enumerate—the financial, legal, and diplomatic situation—being cleared up and adjusted.

Admiral WALKER. Yes; we sum it up, taking the situation as it stands.

Senator HARRIS. And your final conclusion apparently seems to be based upon the fact that the Panama line can be completed for some \$5,000,000 less than the estimate of the other, and that there is a saving in the cost of operation and maintenance.

Admiral WALKER. Those are only two of the elements that enter into it. Our report is based upon the engineering questions, the financial questions, and the whole subject from every possible point of view.

Senator HARRIS. Yes, of course; but the cost of engineering construction, both plans being admitted to be feasible, becomes the ultimate test.

Admiral WALKER. The great change in price of the Panama prop-

erty was a great factor in bringing about a recommendation in favor of the Panama line.

Senator HARRIS. Well, we understand all that; with the old price asked you regarded it as out of the question.

Admiral WALKER. The old price of \$109,000,000 and upward we considered so unreasonable that it was out of the question.

Senator HARRIS. But the reduction of \$69,000,000 was within consideration?

Admiral WALKER. It put things on a very different footing.

Senator HARRIS. I merely wanted to ask some questions about the physical features more than anything else, because there are others who will look into the other matters. Now, in looking at the question of the railroad, of course a railroad is necessary in the construction of the canal.

Admiral WALKER. Yes; by either route.

Senator HARRIS. There has to be a railroad built, of course, for this particular purpose. It will be equipped with rolling stock, which will consist of flat cars and dump cars and equipment of that kind, which is cheaper than the equipment of a road intended for the transportation of passengers and freight ordinarily.

Admiral WALKER. Yes; but there would have to be a certain number of passenger cars for the transportation of people.

Senator HARRIS. Now, in the report of the Nicaragua Canal Commission, I remember there that you mentioned, on page 39 of that report, the Silico Railroad, which is a short piece of railroad constructed running out from Greytown.

Admiral WALKER. Yes.

Senator HANNA. This is the Nicaragua route that you are discussing?

Senator HARRIS. Yes; I was running out from Greytown. That was constructed, according to the evidence given the Commission, for \$18,461 per mile.

Admiral WALKER. Yes, but it is a little narrow-gauge road—a little thing which would not serve the purpose at all.

Senator HAWLEY. A spur?

Admiral WALKER. It would not serve the purpose at all for a working railroad.

Senator HARRIS. But then, there is a certain amount of railroad?

Admiral WALKER. Yes.

Senator HARRIS. In that report you estimate for 100 miles of double-track railroad, which, of course, would be sufficient for all the work of the canal?

Admiral WALKER. Yes.

Senator HARRIS. At \$50,000 per mile?

Admiral WALKER. I do not carry the figures in my mind.

Senator HARRIS. That is on page 44. The report is here. I looked at it this morning, and if my recollection is correct it is for 100 miles of double-track railroad, equipment and everything complete, at \$50,000 per mile. Now, in the later report you estimate the cost of a single-track railroad at \$75,000 per mile?

Admiral WALKER. I do not quite understand that \$50,000 a mile. My recollection is it was considerably more than that.

Senator HARRIS. Well, here is the report.

Admiral WALKER. Oh, that was the other Commission.

Senator HARRIS. That, I say, of the Nicaragua Canal Commission. This was made two years before.

Admiral WALKER. Yes; that was an earlier report.

Senator HARRIS. On page 44, 100 miles of railroad for construction purposes at \$50,000 per mile, double track, \$5,000,000.

Admiral WALKER. I think that that estimate was too low.

Senator HARRIS. Well, that was the report of the Commission.

Admiral WALKER. Oh, yes; that was the report of the old Commission—the former Commission.

Senator HARRIS. Now you estimate the 100 miles of railroad, if it was the same amount, at \$75,000 per mile.

Admiral WALKER. That is the estimate in the report of this present Commission, \$75,000 a mile.

Senator HARRIS. It seems to me, of course, that that is an excessive estimate. Of course I wanted to get at the reason why \$75,000 a mile was taken as the cost of a single-track road.

Admiral WALKER. From the Caribbean Sea to the lake it is a very difficult country, and the cost of construction was very fully discussed in the Commission before \$75,000 a mile was finally fixed upon as a fair estimate. It includes terminals, side tracks, stations, and equipment (rolling stock, etc.).

Senator HARRIS. It is a swampy country for about 20 miles and then it follows the valleys up?

Admiral WALKER. For a considerable distance it is very swampy and difficult for construction, and there would be a good deal of heavy work—heavy cutting—unless the road was lengthened considerably.

Senator HARRIS. The Maritime Canal Company had some miles of track?

Admiral WALKER. About 12. That was across the swampy country.

Senator HARRIS. Well, they crossed the swampy country?

Admiral WALKER. Yes.

Senator HARRIS. That you report, I remember, as being in fairly good condition.

Admiral WALKER. Considering the length of time it has been built, and the way it has been neglected, it was in very fair condition.

Senator HARRIS. Did you think that in the construction of that they had encountered any unusual difficulties?

Admiral WALKER. Oh, the difficulties that come from such a country.

Senator HARRIS. Well, of course, we know that a swampy country requires certain characters of work, but not what you would call unusual or extraordinarily expensive?

Admiral WALKER. No.

Senator HARRIS. Now, of course, down at Panama there is a railroad amply sufficient, I suppose?

Admiral WALKER. Yes; that is a very good road.

Senator HARRIS. For all purposes?

Admiral WALKER. That is a very good road.

Senator HARRIS. I have been over it and I know it was constructed as a good road.

Admiral WALKER. It has been running for many years.

Senator HARRIS. It is a great deal better than is necessary for this purpose.

Admiral WALKER. It is a better road than need be built expressly for construction.

Senator HARRIS. Well, its value in this problem is merely what it is worth for construction purposes and as an auxiliary in maintenance and operation hereafter.

Admiral WALKER. Yes.

Senator HARRIS. And of no value aside from its relation to the canal.

Admiral WALKER. During the time of construction it would be an extremely valuable property. After the canal is completed, it would be available and valuable as an auxiliary to the canal and would have some value for ordinary commercial purposes, but not much.

Senator HARRIS. It is hardly worth considering in such a great work as this.

Admiral WALKER. Not after the canal is completed, except as an auxiliary to the canal for use during necessary repairs, etc.

Senator HARRIS. It is an auxiliary to the construction of the canal.

Admiral WALKER. Yes; but the road owns a great deal of land, and has terminal facilities which are valuable, which all come into this offer of sale.

Senator HARRIS. Their terminal facilities might or might not have value with relation to the canal. Of course, they could be disposed of, I suppose. Don't you think your last estimate of \$75,000 a mile ought to be the maximum price allowed for the value of a property of that kind for this purpose?

Admiral WALKER. Well, we take the Panama Railroad as we find it, with everything that goes with it, and we consider it worth seven millions of dollars for the entire stock.

Senator HARRIS. That is nearly \$140,000 a mile?

Admiral WALKER. Yes.

Senator HARRIS. Now practically or very nearly double what would put us in possession of a property for similar purposes. I am using round numbers.

Admiral WALKER. Perhaps, but a great advantage from buying that road is the fact that it is there and ready and that construction can be begun at once.

Senator HARRIS. Well, that is a question of time which you allow for in your estimate in undertaking the whole work. You estimate that it takes two years to prepare, practically, for the construction of the canal.

Admiral WALKER. Two by Nicaragua, one by Panama, with the Panama Railroad, with its terminal facilities. In fact, the whole island on which Colon is built and the harbor front all belongs to the railroad, with the exception of two piers, which have been sold. Everything is ready for landing material and commencing work there. With the railroad goes all the terminal facilities, the present renting property, and all the facilities of a first-class railroad for a commercial business.

Senator HARRIS. We would be buying a great deal which would not be essential to the canal, as far as that is concerned.

Admiral WALKER. I don't know about that, Senator. I think that all that property would be used and used to great advantage.

Senator HARRIS. Well, in addition to the valuation which you put upon that property of \$7,000,000, there are financial liabilities in other directions which are liable to run up the price materially.

Admiral WALKER. No; the financial liabilities are not great, and would soon be paid off in the natural course of events. With that railroad, you know, goes also the Panama Steamship Line with all of its property. It belongs to the railroad and is a part of the railroad property.

Senator HANNA. Is it not true that during the time of the construction of the canal it would be fair to suppose that the net earnings of the railroad property would pay off all of these outstanding obligations, which were paid in the shape of construction, and more too?

Admiral WALKER. Oh, yes; much more.

Senator HARRIS. Those net earnings are simply charged to the construction of the canal; it is taking money from one pocket and putting it in another.

Senator HANNA. Oh, no; excuse me.

Senator HARRIS. You mean in the transportation of freight for outside parties not relating to the canal?

Senator HANNA. Yes; because that is largely, almost entirely, the business of the last few years, when the canal has simply been under construction with a very moderate force; the net earnings of the railroad company from its legitimate business for which it was built show a very large earning capacity, which would pay off all these bonds and leave a large surplus to the credit of the purchase money.

Senator HARRIS. My idea would be, and I would like to have the Admiral's opinion as to that, that when the full force is put at work and the railroad is here and there diverted and is occupied with the enormous work of construction, that there would be comparatively little opportunity for the operation of the road as a freight road for outside parties.

Admiral WALKER. Oh, it would undoubtedly be run as a commercial road, just as it is now. There is no reason why it should not be. That is, the through line between Panama and Colon would be run as a commercial road.

Senator HARRIS. That would necessarily require the construction of an amount of additional track, which would be used for the other purpose.

Admiral WALKER. Not much additional track, as it is very largely in place now. The track would have to be shifted from time to time, of course, as the work progressed. The tracks for canal work would not interfere with the main line of road.

Senator HARRIS. Then it would require constant change.

Admiral WALKER. Yes, the tracks for canal work; but that would be the case under any circumstances during construction of the canal.

Senator HARRIS. And that would interfere more or less with its operation as a commercial road.

Admiral WALKER. They are using it for both purposes and have been all the time; the canal work does not interfere with its work as a commercial road in any way. With a stronger force at work it would simply be run more after the manner of a large road; there would be more trains on it. There are now two passenger trains a day each way.

Senator HARRIS. In this estimate, of course, the railroad does not cover any of the trackage or property which is used in the cuts and on the Panama Canal itself.

Admiral WALKER. The track in the cuts and that kind of thing belongs to the canal people.

Senator HARRIS. Separate from the other?

Admiral WALKER. Yes.

Senator HARRIS. How about the motive power?

Admiral WALKER. They have their own locomotives and their own cars.

Senator HARRIS. They do not use the locomotives of the railroad for any such purpose?

Admiral WALKER. No, sir; they have their own; they have a large number of locomotives down there.

Senator HARRIS. Now, in regard to the question of harbors, of course, the harbor at Colon, you indicate that it is available for immediate use, but you indicate that it is not a safe harbor and that a large amount of money will have to be expended in making it a safe harbor.

Admiral WALKER. The entrance to the canal will have to be deepened from the deep water of the harbor into the canal, but otherwise the harbor itself will not be interfered with in any way.

Senator HARRIS. There is a reference to a jetty also.

Admiral WALKER. No, sir; no jetty intended to be built there. We simply deepen the entrance. The harbor has been used as a commercial harbor for a great many years. You know it is a good harbor most of the time.

Senator HARRIS. In fair weather.

Admiral WALKER. Occasionally in the winter they have northers which blow home with some force, and at times with sufficient strength to force ships to put to sea, or to the eastward into the harbor of Porto Bello.

Senator HARRIS. I speak of there being some jetty work there. I find on page 92 of your report an estimated cost of this entrance to the harbor of \$8,057,707, of which \$1,936,991 is for work outside the jetty.

Admiral WALKER. Well, the jetty referred to is a little point that the French people have built there that they call Christof Colon. It is not a jetty; it is a point that has been built out and on which they have erected houses. The two great De Lesseps' houses stand on it. It is not what ordinarily would be called a jetty. It protects the inner harbor; protects what will be the canal harbor after the completion of the canal.

Senator HARRIS. I supposed that that was the object, that the object of all of the work described with reference to that harbor was with reference to giving ships a place of anchorage and where they could remain without being subjected to the force and violence of those northers that come in there.

Admiral WALKER. In making the plans of this Commission, the intention was to dredge from the deep water of the bay into this little canal harbor behind the point of Christof Colon, which is spoken of as a jetty.

Senator HARRIS. "Until it reaches a point just inside the jetty constructed by the old Pauama Canal Company."

Admiral WALKER. It is not a jetty at all. It is quite a wide, round point that has been stuck out there for the protection of the mouth of the canal, and there are buildings built upon it—a great lot of dwelling houses.

Senator HARRIS. Do you not think there ought to be a jetty really, or a breakwater or a sea wall constructed to protect that harbor from the influence of those northers?

Admiral WALKER. No, sir; not for canal purposes.

Senator HARRIS. I mean for the safety of shipping?

Admiral WALKER. No, sir; anything that goes there for the purpose of going into the canal will go right into the mouth of the canal, into a little artificial harbor that will be made behind this point, which will always be as smooth as the top of this table.

Senator HARRIS. The estimated cost of this entrance and harbor is said here to be \$8,057,000.

Admiral WALKER. What is that page?

Senator HARRIS. On page 92, where it speaks of the entrance and harbor at Colon.

Admiral WALKER. It is practically all dredging work. The expense outside of the jetty, as it is called here, outside of that point, is largely the removal of rock under water. The bottom there is rocky, and it would have to be dredged enough to give 35 feet in the channel.

Senator HARRIS. On page 124 we find a description of the work involved required to be done at Greytown Harbor. That prepares a basin somewhat similar to the other, and provides for an entrance from the sea and certain jetties. The estimated cost of the entrance to the harbor is given at \$2,198,860.

Admiral WALKER. Yes.

Senator HARRIS. Now that shows, of course, a very large difference—a difference of six millions of dollars—in favor of what is considered necessary at Greytown as against what is necessary at Colon.

Admiral WALKER. Yes, sir.

Senator HARRIS. So that the economy in providing and conducting a sufficient harbor and entrance, which is what is mentioned in both cases, is very largely in favor of the Greytown site?

Admiral WALKER. Yes; according to our estimates, it would cost less to construct it, but the harbor at Greytown would have to be maintained, while the harbor at Colon would probably require little for maintenance.

Senator HARRIS. You say the annual cost of maintenance at Colon is \$30,000?

Admiral WALKER. Yes; that was the estimate. It would cost a little something, but not very much.

Senator HARRIS. Would not \$30,000 probably do the amount of dredging which would be necessary at Greytown to keep out the drifting sands?

Admiral WALKER. Oh, no; probably not. That harbor would have to be kept open by means of dredging, and by occasionally, perhaps, lengthening the breakwaters.

Senator HARRIS. Still the Commission, in its report, does not mention any estimate for maintenance.

Admiral WALKER. I don't recollect whether there is an estimate for maintenance or not. I think there is.

Senator HARRIS. Not for Greytown Harbor. There is nothing said there about the necessity for any serious work in maintenance.

Senator HANNA. Is not the maintenance embraced in the final proposition of the whole canal?

Admiral WALKER. It is in our final estimate—the cost of maintenance and operation.

Senator HARRIS. Of course, there is the cost of maintenance and operation which is applied to both entirely outside of these specific estimates.

Admiral WALKER. No, sir; it takes in these harbors.

Senator HARRIS. In one case there is a special estimate, and in the other it does not seem to have been necessary to make one.

Senator HANNA. But they strike a balance at the end.

Senator HARRIS. I am taking the steps at which the sum total was arrived. In one case it was considered necessary to provide for a specific sum for maintenance, and in the other case there seems to have been no necessity for that; while it is admitted, of course, that any harbor created in that way—everybody would probably admit that some dredging would have to be necessary, but the report does not consider it important enough to mention it.

Admiral WALKER. I think you will find at the bottom of page 141 and on 141 a long reference made to that.

Senator HARRIS. I see there is reference made to work of that kind being necessary, but no amount is mentioned as necessary to be provided for.

Admiral WALKER. On page 142 you will find the following:

After a navigable entrance has been made, dredging will be required for its maintenance, and probably some extension of the jetties may in time be needed. The cost of maintenance is not susceptible of accurate determination, as it is impossible to predict how much sand will accumulate on the east side of the jetty or pass around it into the dredged channel. Some have estimated the total sand drift along the shore at 750,000 cubic yards per annum, but reliable data for an estimate are not available.

There would always have to be a dredge maintained there, and it would have to work a good deal, without doubt, as they do at Port Said in the Suez Canal.

Senator HARRIS. Now, then, taking the harbors on the other side, for instance: The Bay of Panama is an enormous obtuse angle in the coast line.

Admiral WALKER. Yes, sir.

Senator HARRIS. It can not be called a harbor. The point at which vessels unload for Panama is simply protected by a few islands.

Admiral WALKER. Yes.

Senator HARRIS. Which lie 4 or 5 miles out in the bay. The rise of the tide there, about 20 or 21 feet, renders anchorage and everything of that kind more or less difficult.

Admiral WALKER. Oh, not at all.

Senator HARRIS. Does it not?

Admiral WALKER. Oh, no; not at all. The anchorage there is perfectly good. It is very soft mud, and vessels not only anchor there in safety, but they run into the mud. They pay little attention to the depth of the water. They run into the mud and receive and discharge their cargoes.

Senator HARRIS. The canal has to be excavated out to this point?

Admiral WALKER. The canal is excavated out to this point, but in our estimates we estimate for a channel of 35 feet at low water, which some of our members consider unnecessary, claiming that 35 feet at mean tide would be enough. That would save a good deal of money, but in making our estimates we put both lines upon precisely the same basis of 35 feet at mean low water everywhere.

Senator HARRIS. Of course vessels there are not subject to storms.

Admiral WALKER. No; there are no winds of any consequence in the bay of Panama, nothing that would endanger vessels.

Senator HARRIS. And so much so that sailing vessels frequently have to be towed out to get beyond the influence of the bay.

Admiral WALKER. Well, sailing vessels have gone in and out ever since we know anything about that country, but the bay is a bay of light baffling winds.

Senator HARRIS. They have to be towed out occasionally when time is an essential.

Admiral WALKER. If we had a canal there, there would undoubtedly be towboats to tow sailing vessels, if any went through.

Senator HARRIS. I think it is pretty well known that where time is an important factor they are towed out.

Admiral WALKER. If we towed vessels the same distance by each route, we would tow ships going through the Panama Canal 120 or 130 miles to sea, towing the same number of miles.

Senator HARRIS. Then you have to measure the miles up the coast?

Admiral WALKER. I am only speaking of getting vessels to sea and out into the winds. Sailing vessels would have to tow through the Nicaragua Canal 184 miles.

Senator HARRIS. You mean then to treat the Nicaragua Canal merely

as part of the voyage as you would the other point where they are towed?

Admiral WALKER. Yes; they would have to tow through, which would be 184 miles. Now, if they towed 184 miles in going through the other canal, they would be out 120 or 130 miles, we will say, to sea, in the open sea.

Senator HARRIS. At Brito, of course, so far as the storms are concerned, the condition are somewhat similar, although the trade winds come in there.

Admiral WALKER. At Brito there is usually a fresh trade wind blowing offshore.

Senator HARRIS. But it is not really a region subject to storms.

Admiral WALKER. No, sir; they occasionally have winds from the southward, strong winds sometimes, sometimes a gale, but they are not common.

Senator HARRIS. Now the construction of the harbor contemplated at Brito means the excavation, as I understand it, of soft material which will be done almost wholly by dredging to the extent of 160 to 200 acres right at the mouth.

Admiral WALKER. It will have to be an entirely artificial harbor excavated out of a cypress swamp. There is no particular difficulty in making it; it is simply a question of money.

Senator HARRIS. It is the cheapest character of work?

Admiral WALKER. Yes; cheap work.

Senator HARRIS. That would make an absolutely safe harbor?

Admiral WALKER. Oh, a perfectly good harbor, excepting that it would be small, and near enough to deep water for the sea to run into it a little, but I do not think enough to amount to anything. With a strong southerly wind enough sea might, at rare intervals, run into the harbor to make some trouble.

Senator HARRIS. That would be determined by the width of the opening and the entrance.

Admiral WALKER. It would be difficult to make an opening that a southerly sea would not run into.

Senator HARRIS. Of course, the advantage there would be for sailing vessels that they could make use of their own power at once.

Admiral WALKER. Ordinarily the moment they are out of the harbor at Brito they could make sail and go about their business.

Senator HARRIS. The expense involved in excavating the four and a half miles out from the Panama Canal and maintaining that and keeping it open—dredging—would be fully as great as the expense of creating this harbor at Brito, would it not?

Admiral WALKER. I do not think that after the harbor at Brito was once made it would require very great cost for maintenance. It would take care of itself pretty much. There would be occasionally a little work, but not much. At Panama there would have to be some dredging done, because this excavation is largely through soft material.

Senator HARRIS. With a 20-foot tide there would naturally be a current drifting into the channel.

Admiral WALKER. The whole place is so open that the current would not be strong, and I should think the cost of maintenance would not be excessive there, but there would be some cost as there would be about everything.

Senator HARRIS. Now there is another feature about the Panama line which is, perhaps, the key to the whole canal, and that is the Bohio dam.

Admiral WALKER. Yes.

Senator HARRIS. Everything, so far as that is concerned, as a canal route, depends on the Bohio dam?

Admiral WALKER. Yes.

Senator HARRIS. That is the key. The estimate of the Commission for the Bohio dam, \$6,369,640, does not seem to include the cost of a temporary dam which may be and is considered necessary, I believe.

Admiral WALKER. Probably necessary.

Senator HARRIS. For the construction?

Admiral WALKER. Yes; there would probably have to be some temporary work.

Senator HARRIS. Mr. Morrison, in an article which he has prepared, makes an estimate of nearly \$2,000,000?

Admiral WALKER. Yes.

Senator HARRIS. Bringing the cost of the dam up to something over \$8,000,000. Well, as a part of the Bohio dam is the Gigante spillway; that is, it is a part of that feature of the work.

Admiral WALKER. Yes; it is a part of the lake feature.

Senator HARRIS. Well, the summit level and the lake. That amounts to \$1,209,419; and as a part of the spillway, and a necessary part of it, the Pena Blanca outlet must be included.

Admiral WALKER. Yes, sir.

Senator HARRIS. Those three estimates all practically comprise the cost of creating Lake Bohio.

Admiral WALKER. Yes.

Senator HARRIS. The cost of the Pena Blanca outlet amounts to \$2,445,000.

Admiral WALKER. I assume that your figures have been taken from the report, and are correct, so that I do not raise any question about them.

Senator HARRIS. The cost of Bohio dam is given on page 96, and of the spillway and Pena Blanca outlet on page 97. I read them this morning, and I know that they are correct.

Admiral WALKER. Yes.

Senator HARRIS. There is nearly \$11,000,000, being the total cost of Bohio dam.

Admiral WALKER. Yes, and for the creation of Lake Bohio.

Senator HARRIS. Aside from the works necessary at the upper end of it.

Admiral WALKER. There are no works necessary at the upper end. The dam and the waste way and the channel from Pena Blanca swamp cover the whole matter.

Senator HARRIS. I was thinking of some gates.

Admiral WALKER. They are merely a part of the canal.

Senator HARRIS. They are just at the upper end of the lake.

Admiral WALKER. Yes; they are put in as a safeguard in case of trouble, or if it should be necessary to draw off the water in the Culebra cut.

Senator HARRIS. The corresponding feature of the other route is the Conchuda dam.

Admiral WALKER. Let me say here that Mr. Morrison estimates for a very much cheaper dam at Bohio.

Senator HARRIS. He thinks a dam of earth and stone can be put in there.

Admiral WALKER. Yes; he thinks the estimate of the Commission was very high for that dam—excessively high—but we adopted that as being a perfectly safe dam, and one upon which the canal could safely rest for all time.

Senator HARRIS. Mr. Morrison not only objects to the cost, but he has some apprehension with regard to the construction of the dam. He says it involves "novel and untried features; few engineers even among those who feel that they could construct it would be ready to say in advance how the work would be done. The difficulties taken in connection with the climate and other surroundings are enormous."

Admiral WALKER. Yes; it will be a difficult work.

Senator HARRIS. And I presume that feature was discussed, the fact that there is a dam nearly half a mile long and nearly one-half of it requires the pneumatic process to the depth of 128 feet below the sea level, which is something beyond any engineering experience that we know anything about, I mention that in that dam there was involved in its extreme length and height the sinking of some 324 feet of its length to the depth of 128 feet below the sea level.

Admiral WALKER. I do not think you will find that we go down to that depth for anything like that length.

Senator HARRIS. If you will excuse me, I will put it exactly as it is; that is, taking from minus 30 to minus 128 feet, there would be some 1314 feet in length of dam.

Admiral WALKER. Yes; part of that would be done by the pneumatic process.

Senator HARRIS. I think that amount, everything below minus 30, is to be done by the pneumatic process. The report so states. That is really beyond any engineering experience we have in the use of that process.

Admiral WALKER. Yes; that part which goes down to minus 128 feet.

Senator HARRIS. That process has been utilized in sinking bridge piers and things of that kind that are, none of them, I think, in this country, over 100 feet below the level of the water.

Admiral WALKER. Something over 100 feet, I think.

Senator HARRIS. I think at St. Louis in the sinking of one of the bridge piers there that they got as low as 110 feet. That is about the deepest we know, and the atmospheric pressure involved was something enormous. Did the Commission say anything or discuss anything as to the number of hours that a man could work in the caissons?

Admiral WALKER. The whole subject was talked over. We have on our Commission three men, certainly, whose opinions on all bridge work and deep foundations are as good as anybody's in this country.

Senator HARRIS. Well, one of the very best of those engineers in this article I refer to by Mr. Morrison speaks of it as I have indicated: "Few engineers even among those who feel that they could construct it, would be ready to say in advance how the work would be done. The difficulties taken in connection with the climate and other surroundings are enormous." He also speaks in another place in this article of the extreme difficulty of getting the work of the caissons at the bottom and making the foundation water-tight. In fact, he says here, "The design involves the extension of pneumatic work to unprecedented depths, involving special details in making the joints between the caissons," and it is owing to his doubt, apparently, of the success of the work that he strongly recommends the other plan.

Admiral WALKER. I think he agreed that the work could be done, but he thought there would be a large saving of money in building a different style of dam and that the style of dam which he advocated would be a sufficiently good one. It was a question of seepage, of how much water would go under the earth dam which was proposed by the French engineers and that which is proposed by Mr. Morrison, whether

enough would go under to make it dangerous. Mr. Morrison thought there would not.

Senator HARRIS. Of course, everybody who is familiar with water-work of that kind, the building of dams, knows the almost impossibility of estimating the danger involved in leakage.

Admiral WALKER. Yes.

Senator HARRIS. And the penetration of your work by water with a head, say, of 85 to 95 feet.

Admiral WALKER. Mr. Morrison thought the seepage would be so small as to be of little consequence, but the Commission as a whole thought it better to estimate on a dam which would be perfectly safe.

Senator HARRIS. Well, but Mr. Morrison does not agree that that would be safe, because—

Senator HANNA. Excuse me for interrupting, but is it quite fair to discuss Mr. Morrison's testimony when we are going to have him before us?

Senator HARRIS. I want to get at the opinion of Admiral Walker as to these points.

Senator HANNA. You are quoting Mr. Morrison.

Senator HARRIS. Certainly; and we will probably have the advantage of Mr. Morrison's testimony.

Admiral WALKER. I am not a bridge or dam expert, but I think it is entirely possible to build a dam as recommended by the Commission.

Senator HARRIS. Mr. Morrison says so, and I am perfectly willing to say, just as all engineers now practically say, that anything is possible, given money and time enough. The Treasury of the United States and unlimited time would probably do anything. That is the position which nearly all engineers take with regard to any piece of work. It can be done, given money and time enough. The only element or difficulty involved in the Bohio dam and the Gigante Spillway and the Pena Blanca outlet, of course, is what the extreme torrential flood of the Chagres River may require.

Admiral WALKER. Yes.

Senator HARRIS. That is the force which has got to be resisted and taken care of. From Bohio to the summit really the Chagres is a torrential stream.

Admiral WALKER. It is safe enough to call the Chagres a torrential river.

Senator HARRIS. Of course, there the country begins to rise rapidly and sharply and steeply?

Admiral WALKER. Where you pass out of Lake Bohio in going west in the canal, you begin to strike what we call a torrential stream, but the Chagres, you know, is navigable away above Alhajuela.

Senator HARRIS. At times.

Admiral WALKER. At all times.

Senator HARRIS. Well, of course, but I mean—

Admiral WALKER. I have come down the Chagres River from a considerable distance above Alhajuela in the dry season in a large canoe, and there was plenty of water.

Senator HARRIS. I am speaking of the torrential character of the floods. They come rapidly—the water rises from 30 to 40 feet in a night.

Admiral WALKER. During very heavy rains. I can not tell you how long it takes to reach the maximum, nor what the highest observed flood has been, but they are not as great as are commonly supposed. The French company has a careful record that has been kept for a number of years, and it is undoubtedly correct.

Senator HARRIS. There is some record of 40 feet in ten hours; that is what I had in mind as being the maximum observed.

Admiral WALKER. The Chagres is a troublesome river, of course, as all torrential rivers in the Tropics are.

Senator HARRIS. The rise provided over the Gigante Spillway, of course, is supposed to accommodate about 5 feet over its crest without any difficulty?

Admiral WALKER. Yes; and to go higher if necessary.

Senator HARRIS. But if it gets over that much, then it will begin to encroach on the locks?

Admiral WALKER. No; there are 10 feet free board allowed over the top of the spillway to the top of the dam.

Senator HARRIS. The level was to be maintained at 90 feet—yes, 10 feet, and then 100; that is right.

The CHAIRMAN. What would be the height of the whole dam at Bohio from the foundation up to the top?

Admiral WALKER. I should have to look that up to give it to you correctly; there are so many figures I can not carry them all in my head.

Senator HARRIS. The crest of the dam at Bohio is 100 feet above sea level?

Admiral WALKER. Yes.

Senator HARRIS. The lowest part of the foundation is 128 feet below, so that the structure would be 228 feet high.

Admiral WALKER. Yes, extreme height from lowest point of foundation if it is built on the plan suggested by the Commission. But of course you will understand that the kind of dam and various features here are suggestions by the Commission which might be adopted finally if the canal was built by that route, or might be modified to any extent thought necessary.

The CHAIRMAN. I understand the proposition put forward by Mr. Morison in his article in that paper there was discussed by the Commission and rejected?

Admiral WALKER. We discussed it to some extent; not in detail. The details were not before the Commission.

The CHAIRMAN. Did you reject it? That is the point.

Admiral WALKER. The Commission rejected it. The Commission was in favor of putting in a concrete core, going down to bed rock, and burying the core in an earth dam, the concrete core being put in to prevent seepage under the dam, which it was thought might be dangerous.

The CHAIRMAN. But you rejected Mr. Morison's proposition?

Admiral WALKER. Yes; Mr. Morrison thought the seepage would not be dangerous, but the other members of the Commission were not willing to risk it, as the whole safety of the canal depends upon the integrity of the dam.

Senator HARRIS. This Bohio dam work providing for Lake Bohio and all that, will require about eight years' time, I think it is estimated.

Admiral WALKER. I think, if I recollect right, that we estimated for a shorter period, the estimate for Culebra Cut, eight years, being the greatest of all.

Senator HARRIS. Now, the corresponding feature on the other line precisely similar in its importance to the work establishing the upper level, or practically the head water, is the Conchuda dam.

Admiral WALKER. Yes.

Senator HARRIS. That will create a summit level in the river of some 50 miles, and in connection with the lake will give a summit level of 120 miles.

Admiral WALKER. It will give a summit level from the dam to the lake, and then of course across the lake and to the first locks on the west side.

Senator HARRIS. In round numbers, about 120 miles.

Admiral WALKER. Yes.

Senator HARRIS. And that, of course, is of a character of navigation which can almost be said to be simply a part of the general voyage, as you said a while ago; it would involve towing, perhaps, in the river, but sailing vessels could cross the lake without any towing.

Admiral WALKER. As a matter of fact, sailing vessels would probably take a tug outside of Greytown, and tow from there until they were outside of Brito. It would hardly be worth while to cast a tow off for a little distance across the lake and then take it up again.

Senator HARRIS. That is very likely true.

Admiral WALKER. A large sailing vessel would probably have a powerful tug ahead to pull her along and a small tug under her quarter to help her steer in the narrow shallow water.

Senator HARRIS. So far as steamers are concerned, it would be simply a part of the voyage; there would be no particular features involved in it.

Admiral WALKER. Except that there is always some risk with large, deep-draft ships in canals, in very narrow waters and very close to the bottom.

Senator HARRIS. The bigger the ship the greater the risk everywhere, so far as that is concerned.

Admiral WALKER. That is not the case at sea. It is especially so in a canal—in any canal.

Senator HARRIS. In harbors when you get near the coast it is?

Admiral WALKER. It does not make any difference about the size of the ships until you get into shoal or narrow waters.

Senator HANNA. Do you think that any large ship, the maximum-sized ship, operating in this canal, could go around these bends without the aid of a tug? I mean steamship or otherwise.

Admiral WALKER. I think they would go without a tug by both canals.

Senator HANNA. Could they make all the turns?

Admiral WALKER. I think so.

Senator HANNA. Suppose the wind was blowing pretty hard?

Admiral WALKER. If there was a strong breeze, it might occasionally cause some trouble. By the Nicaragua line there would at times be a considerable current from the lake to the Couchuda dam; with a strong wind blowing and a strong current they might have difficulty without a tug, but under ordinary circumstances I think they would go through without difficulty.

Senator HARRIS. Did not the Commission work out this question of curvature in detail in such a manner as to show clearly that no curvature is estimated in this work which would involve any difficulty in a vessel passing through there?

Admiral WALKER. I think there are no curves that would involve any particular difficulty, ordinarily. Of course, with a strong wind blowing or with a strong current a large ship might get into some trouble.

Senator HARRIS. That might happen anywhere on either route.

Admiral WALKER. Yes, but both routes are practically good enough for steamers to pass through with their own power.

Senator MITCHELL. What is the difference in the curvature of the two routes?

Admiral WALKER. There is a considerable difference in favor of Panama. There is but one sharp curve in the Panama line, and that is entering the inner harbor at Colon going around what the Senator (Harris) called a jetty. There is a sharp curve there, but in a wide channel—at that point the channel is from 500 to 800 feet wide—a sharp curve does not give trouble if you have plenty of room to turn in.

The CHAIRMAN. In the curvatures in the Nicaragua route, did you make allowances by widening the channel?

Admiral WALKER. Widening the channels on the curves; yes, sir.

The CHAIRMAN. In all of them?

Admiral WALKER. Yes; every case that came within the rules.

Senator HARRIS. There is a provision that curves of less than 12,000 feet radius in channels less than 500 feet wide the width is increased?

Admiral WALKER. We formulated a rule and carried it right through our work.

Senator HARRIS. While we are speaking of that, the time of passage allowed for is thirty-three hours?

Admiral WALKER. Thirty-three by one and twelve by the other.

Senator HARRIS. Of course you propose that this shall be navigable at night; it shall be lit up.

Admiral WALKER. That we have not gone into at all or estimated for.

Senator HARRIS. In discussing the time was not that brought up?

Admiral WALKER. It was talked over in an informal way as to whether the canal would be lighted or not. It was thought that perhaps at first it would not be, and eventually it might be.

Senator HARRIS. The Suez Canal is lighted at night?

Admiral WALKER. I don't know how effectively.

Senator HARRIS. Well, so that vessels pass through at night?

Admiral WALKER. The Kiel Canal is lighted. If either of these canals (Panama or Nicaragua) were built by the United States Government they would eventually be lighted, but we made no allowance for lighting, excepting for light-houses at terminal ports.

Senator HARRIS. Getting back to the Conchuda dam which I spoke of, comparing it with Bohio dam, we have it estimated on page 159 at \$4,017,650, and for the wasteway, which is necessarily a part of it, \$2,045,322, making a little over \$6,000,000 in all.

Admiral WALKER. Yes.

Senator HARRIS. And the estimate of time is four years.

Admiral WALKER. Yes.

Senator HARRIS. So that in considering those two vital points of each line, we have at Bohio nearly \$11,000,000 to be expended, to say nothing of the doubts that might be involved as to how it is to be done, as suggested, eight years' time, and at Conchuda we have \$6,000,000 and four years' time, and at Conchuda the maximum depth is 82 feet.

Admiral WALKER. Yes.

Senator HARRIS. And the total length of the dam, I think, is some 1,100 feet?

Admiral WALKER. I do not carry the figures in my head, but they are here somewhere.

Senator HARRIS. Of course, that is a matter of record, and no one has suggested any doubts or difficulties at all with regard to the construction of the Conchuda dam that you know of?

Admiral WALKER. Oh, no; there is no question about it. We had great trouble in finding a good location for the dam, but once found, there is no trouble. The location is in a wild country, and it will be a large, troublesome, and expensive dam to build, but it can be built.

There is no doubt about it in the mind of any member of the Commission.

Senator HARRIS. Then in the total time of construction the Commission allows ten years for the Panama and eight years for the Nicaragua Canal?

Admiral WALKER. Yes.

Senator HARRIS. Now, I have suggested certain conditions which I thought ought to be fairly considered: First, in the cost of an adequate railroad to do this work for the Government, as between the price which is estimated to be paid for the Panama Railroad; and then I have suggested a very large difference in the cost of the harbor and entrance at Colon, which is nearly six millions greater than that at Grey Town, and then I have shown, I think, that the essential feature in the canal in both cases being the dam the one at Bohio is about eleven millions as against some six millions at Conchuda, and then again in the total time to be required in the work there are two years advantage in favor of Nicaragua. Now, those things are supposed to be offset and balanced by this \$5,000,000, which was the turning point in the opinion of the Commission as to the relative merits of the two routes.

Admiral WALKER. That and other things that come in. You must remember a difference of nearly \$1,500,000 annually, \$1,300,000 certainly, in the cost of maintenance and operation.

Senator HARRIS. Yes, I should have mentioned that.

Admiral WALKER. That is a very large sum to fund.

Senator HANNA. How much capital does that represent?

Admiral WALKER. Sixty or seventy millions. I suppose the Government can borrow money for about 2 per cent.

Senator HANNA. Yes; less than that.

Senator HARRIS. So far as the difference in length is concerned, as I gather from the report of the Commission, in a large part of the trade the advantage still would be in the total voyage in favor of Nicaragua.

Admiral WALKER. According to our figures, and we supposed everything of course to go smoothly by both routes, we considered that from our eastern coast to San Francisco the advantage by the Nicaragua route was about a day; from our Gulf ports it would be about two days.

Senator HARRIS. Excuse me, just there. Would it not have that advantage with Hawaii and Japan and with the trade lying north?

Admiral WALKER. Yes; it would have that with all the trade that went north and west, but you must remember that that is an estimate of time which is subject to a good many errors. The passage of a ship through a canal 49 miles long, for instance, is much more likely to be without delay than through one 100 and odd miles long.

Senator HARRIS. Right at that point I would like to get your idea of comparing the two routes. Here is 70 miles of lake navigation on the Nicaragua route and 50 miles of slack-water navigation on the river, and about 63 miles of actual canalization.

Admiral WALKER. There is more than that. I should call it 70 miles of canalization and then say 50 miles of improved river. A ship is subject to accidentally grounding in the canal and in the canalized river. Part of the canalized river, you must remember, consists of cuts where we have cut through points; that is canal section, like the rest of it.

Senator HARRIS. Except it is of greater width and depth.

Admiral WALKER. The same. It would be really part of the canal. There is a certain danger always of a ship, particularly a large one,

grounding in narrow waters and where she is close to the bottom. You must remember the depth would be but 35 feet, and a big ship does not steer well under those circumstances. A certain number would go aground every year or every month, and would block the canal for a little time and would cause delays.

Senator HARRIS. Well, it is not so great as if it was all canal.

Admiral WALKER. Not so great as if it was all canal, of course, but it is greater by the long Nicaragua route than it would be by the Panama route, whatever the differences. Experience would have to show that, but there is certainly a difference in favor of Panama in that way.

Senator HAWLEY. A shorter exposure?

Admiral WALKER. Yes; it is the difference between going 2 miles and 5.

The subcommittee then (at 12.10 o'clock p. m.) took a recess until 3 o'clock p. m.

AFTER RECESS.

The subcommittee met at 3 o'clock p. m.

Present: Senators Morgan (chairman), Hanna. Also Senators Milard, Harris, Hawley, and Kittredge, members of the committee.

ADDITIONAL STATEMENT OF ADMIRAL JOHN G. WALKER.

The CHAIRMAN. Senator Harris, had you concluded your examination?

Senator HARRIS. There is only one further point, if the committee will indulge me, that I would like to ask the Admiral about, and that is with reference to the summit cut there at Culebra. That, of course, is almost as vital as the Bohio Lake and dam, and involves very much more work in this and outlay than any other single piece of work on either line, does it not?

Admiral WALKER. I think the opinion now is that there is no particular difficulty about the Culebra cut. The only thing to be said about it is that it is of great magnitude. There is a great deal of material to be removed.

Senator HARRIS. Forty-four millions of yards, and your estimate is that it will take about eight years to do it?

Admiral WALKER. Yes, that is the estimate we put upon it; but I believe myself, and I think other members of the Commission, some, certainly, believe that if we were to go in there with American contractors the time would be considerably shortened.

Senator HARRIS. There is one point in regard to that that I wanted to ask you. Of course your opinion would be perhaps as good as that of anybody else, even these expert engineers. The Commission says that all difficulty with regard to slipping can probably be avoided, I think, by proper drainage.

Admiral WALKER. Yes; they did have some bad sliding, but that was surface material, which has been largely removed, and by draining it it will probably give no trouble.

Senator HARRIS. The material softens in water, and so far as the canal itself is concerned, it will require a wall on each side.

Admiral WALKER. Yes; in the Culebra cut.

Senator HARRIS. To prevent it from dissolving and sliding down?

Admiral WALKER. Yes; to avoid all trouble.

Senator HARRIS. Now, with the very flat slopes which would be necessary in a cutting of that depth, what is to prevent this heavy rainfall from having that same effect on the slopes?

Admiral WALKER. The slope of the cut need not be so very flat, but where it will be in water permanently the idea was to support it with a face wall.

Senator HARRIS. Don't you think it will require a very great slope, the material there, in order to be safe?

Admiral WALKER. No; I think not. I can not say now just what the slope was that we allowed. I believe it was 1 on 1.

Senator HARRIS. Would you not think it would require a slope of 2 or 3 to 1?

Admiral WALKER. No; I should think not. That was carefully considered by the Commission when we determined on the slope. I am not positive as to what it was, but we determined upon a slope that we considered entirely safe.

Senator HARRIS. I thought it was about that figure.

Admiral WALKER. I don't think it is as much as that. The report tells, however.

Senator HARRIS. Now, in the matter of draining those slopes and preventing the effect of the water, what was the suggestion made as to a practical way?

Admiral WALKER. We do not drain the slopes; we drain only the surface material—the soil and the surface material on top.

Senator HARRIS. Well, ditches would have to be dug back of the cut?

Admiral WALKER. Yes; down in the cut itself, it is very hard material; it is not rock, but it is a compact clay that is so hard that it has to be blasted.

Senator HARRIS. Does not that get soft and disintegrate?

Admiral WALKER. It disintegrates in water.

Senator HARRIS. Well, with a heavy rainfall?

Admiral WALKER. No; the rain would run off it.

Senator HARRIS. Without a gradual softening?

Admiral WALKER. Oh, I think so. We might have perhaps a little of the surface material run down, but we propose a bench at the bottom of the cut, a wide bench to catch anything that comes down; but I think there will be no trouble. There might possibly be places where a small quantity would slide out. That may be, as is often done, protected by a covering of concrete.

Senator HARRIS. Well, there are places naturally in the mountains like that where streams and things will come out and find their way to the surface.

Admiral WALKER. Yes; it will have to be protected in places, but we do not anticipate any difficulties in regard to it.

Senator HARRIS. Just a last question: Do you not think that on all of these important vital points, the magnitude of the work is much greater on the Panama line than on the Nicaragua line?

Admiral WALKER. The great Culebra cut is the largest piece of work on either line and the Bohio dam is the largest piece of work in the way of dams. Those two pieces are larger than anything on the other line, but there is nothing else that I know of.

Senator HARRIS. The possibility of accidents and contingencies and the cost of maintenance are increased in proportion.

Admiral WALKER. No; I do not see that the cost of maintenance is at all, or the chance of accidents; I do not see that there is anything to be apprehended.

Senator HARRIS. You do not think the chances of accident are greater in a work of great magnitude than in a work of smaller magnitude?

Admiral WALKER. I do not think the chances of accidents along the canal line amount to very much.

Senator HARRIS. That is all.

The CHAIRMAN. Do you wish to ask any questions, Senator Hanna?

Senator HANNA. I will after you are through, Mr. Chairman.

The CHAIRMAN. And do you, Senator Kittredge?

Senator KITTREDGE. Not before you.

The CHAIRMAN. I would like to have a statement of the items of cost of maintenance on both routes.

Admiral WALKER. I don't know that I can give you that, Senator. It is like a great many other things that we worked up, determined upon the amount, and put into our report. I don't know that I can give you the exact figures in detail. Perhaps I can, but I am not sure.

Senator HAWLEY. Well, give us a good guess.

Admiral WALKER. Oh, I know what the amount is. The amount by one is \$2,000,000, and by the other \$3,300,000, but just how we get at that I can not tell you off-hand, and I am not sure that I can give you a memorandum of it.

The CHAIRMAN. I want to get at least the leading facts which would show the difference of \$1,000,000 in the maintenance of these two canals.

Admiral WALKER. The difference comes from various things. In the first place, it comes from a larger lock force, a longer canal, and more expense in the way of maintaining channels, banks, and all that kind of thing. There are a good many items that enter into it.

The CHAIRMAN. The locks on the Panama Canal and on the Nicaragua Canal are the same size.

Admiral WALKER. The same size according to our plan.

The CHAIRMAN. Are they double locks on both the canals?

Admiral WALKER. Double locks on both the canals, twin locks as we call them, two locks side by side.

Senator HARRIS. The Panama has the only flight of locks, that is two locks immediately together?

Admiral WALKER. Yes.

Senator HARRIS. With a very much larger lift than anything on the Nicaragua line.

Admiral WALKER. Yes; taking the two locks together they lift higher in that short distance.

Senator HARRIS. The average lift of each lock is 45 feet.

Admiral WALKER. Ninety feet, maximum, for the two.

Senator HARRIS. The maximum on the other line is 36½ feet.

Admiral WALKER. Yes.

The CHAIRMAN. Are there these double lifts of two locks on both sides of the Panama Canal?

Admiral WALKER. Yes.

The CHAIRMAN. How many locks are there on the Panama?

Admiral WALKER. Five.

The CHAIRMAN. How many on the Nicaragua?

Admiral WALKER. Eight. The reason that there are five on the Panama is because of the great rise and fall of the tide in Panama Bay. We lift up from the Atlantic to the surface of Lake Bohio with two locks and then we drop down on the Pacific side with three locks, the last lock being the lock in which the lift varies very much, depending on the height of the tide.

The CHAIRMAN. Is it the maintenance of those locks that causes this great difference in the cost of maintenance?

Admiral WALKER. That is one item. Where there are eight locks there is, of course, a lock force for eight, and the other has a lock force for five locks, the men that are necessary, the machinery, and repairs to machinery, and all that sort of thing, and the men necessary to manipulate it.

The CHAIRMAN. It would cost about the same to maintain a lock on one canal as on the other?

Admiral WALKER. We have so estimated.

The CHAIRMAN. You equalize them in that particular?

Admiral WALKER. Yes.

The CHAIRMAN. So the difference is between five and eight?

Admiral WALKER. Yes.

The CHAIRMAN. That is the difference in the maintenance of three locks.

Admiral WALKER. The difference of maintenance of three locks; yes, sir; that is one item.

The CHAIRMAN. Well, now, with the maintenance of these three additional locks, how much summit level water do you get?

Admiral WALKER. Why, I don't know as that has anything to do with it. I don't understand what you mean.

The CHAIRMAN. I would like to have you answer the question, and we will determine whether it has anything to do with it.

Admiral WALKER. I don't understand what you mean.

The CHAIRMAN. I mean how much water, summit level, do these locks on the Panama Canal give you?

Admiral WALKER. They do not give us any at all.

The CHAIRMAN. Is there any distance between Bohio and Miraflores?

Admiral WALKER. Yes, but the locks do not give it to us; the dam is what gives us water—creates the lake. The locks are merely a method of stepping up or down.

The CHAIRMAN. The locks are a part of the dam?

Admiral WALKER. No, sir; no part of it at all.

The CHAIRMAN. Are the locks kept open and does the water sluice through all the time?

Admiral WALKER. No, sir; they are sometimes open and sometimes closed. They are not a part of the dam.

The CHAIRMAN. I had supposed that the locks had something to do with retaining the water in that basin.

Admiral WALKER. Of course, if the passage through the locks was kept open the water would flow through.

The CHAIRMAN. And if it is kept shut it would not?

Admiral WALKER. Probably not.

The CHAIRMAN. And so it operates as a dam when it is kept shut?

Admiral WALKER. It does not allow the water to pass through when it is shut.

The CHAIRMAN. It operates as a dam then?

Admiral WALKER. You might say that the water pipe leading from a reservoir operates as a part of the dam or reservoir.

The CHAIRMAN. Does not the upper lock at Bohio have something to do with keeping the level of the water through the Miraflores?

Admiral WALKER. The lock is intended as a method of passing ships from one level to another.

The CHAIRMAN. I understand that. When the lock is closed does it not maintain the surface level between Bohio and Miraflores?

Admiral WALKER. In a very small way it helps to maintain the surface level.

The CHAIRMAN. According to its width it maintains it as much as the dam does.

Admiral WALKER. Yes, according to its width and depth.

The CHAIRMAN. Very good. How much summit level—what is the length of summit level that these locks on the Panama Canal give to ships, water level?

Admiral WALKER. The Bohio dam makes a lake which is, somewhat roughly speaking, I should say, 12 miles long.

The CHAIRMAN. Well, from that on to Miraflores?

Admiral WALKER. Then you pass through the canal proper after you get out of the lake to the Pedro Miguel locks; I don't remember just what the distance is. It is given in a table in this report.

The CHAIRMAN. What is the distance between Miraflores and Bohio?

Admiral WALKER. I shall have to look at this report to make sure of it. I do not carry the figures in my mind.

The CHAIRMAN. It is 22 or 23 miles, is it not?

Admiral WALKER. I can not state without looking the thing up.

The CHAIRMAN. It is about 13 miles, or 14, from Obispo to Bohio?

Admiral WALKER. It may be.

The CHAIRMAN. Well, you say it may be. I ask you whether it is or not?

Admiral WALKER. I don't know without looking it up. I don't carry all of these figures in my mind. I have had a multitude of figures to deal with, and I do not pretend to keep them all in my mind; but it is a very simple matter to tell what it is. [Referring to the report:] It is about 21 miles from Bohio to Pedro Miguel.

The CHAIRMAN. Then, with the assistance of the dams and locks you get 21 miles of summit level navigation on the Panama Canal?

Admiral WALKER. Yes.

The CHAIRMAN. How much summit level navigation do you get with the assistance of locks and dams on the Nicaragua route?

Admiral WALKER. Well, in summit level you get whatever the distance may be from where the canal enters the river until you reach the first lock on the west side. I should judge the distance to be about 120 miles, roughly speaking. That is an estimate; it may not be very accurate, but it is somewhere in that neighborhood. Part of that distance is through the canal and part through the canalized river and part in the lake.

The CHAIRMAN. What do you allow as the cost of maintenance on that 120 miles of summit level navigation on the Nicaragua Canal?

Admiral WALKER. I don't know; I can't tell you what that is. It is the cost of keeping the canalized river in order and the cost of keeping the channel open in the lake at the east end, where there is a cut of about 14 miles into the lake, and a small amount on the west side; probably very little there.

The CHAIRMAN. It seems from the statement of your last report, as called out by Senator Harris to-day, you make no allowance for maintenance of keeping up the harbor and the outlet at Greytown.

Admiral WALKER. Oh, we do; there is an allowance made for that.

The CHAIRMAN. Do you recollect how much it is?

Admiral WALKER. One hundred thousand dollars per year.

The CHAIRMAN. Is there any allowance made for keeping up the harbor at Brito?

Admiral WALKER. An allowance is made for that also, of \$50,000 per year.

The CHAIRMAN. You have looked over all of the facts in your pre-

liminary report to Congress and all the facts in your final report, I suppose, carefully.

Admiral WALKER. Yes, sir; but not recently.

The CHAIRMAN. You remember the facts as you stated them before this committee on examination, of course?

Admiral WALKER. In a general way; yes, sir.

The CHAIRMAN. Have you any change to make in the statement of any fact that is contained in either of those three statements?

Admiral WALKER. The preliminary report I should throw out altogether, because that was a preliminary report, but everything is covered by the final report.

The CHAIRMAN. But the facts stated in the preliminary report?

Admiral WALKER. I could not assert they were all right, because we might have changed our minds on some things later.

The CHAIRMAN. Are there any that you can assert are wrong?

Admiral WALKER. I have not looked the preliminary report over to see whether there are or not, but the preliminary report is simply a preliminary statement. We must deal with the final report. I am not speaking of the supplementary report, but of the final report.

The CHAIRMAN. If there are no differences between the preliminary report and the statement of facts in the final report, then you stand by the facts stated in the preliminary report?

Admiral WALKER. I should stand by the facts in the final report, and if they agree with the preliminary report, of course the preliminary report would be right.

The CHAIRMAN. You stand also by the facts in your deposition or in your statement before this committee?

Admiral WALKER. Yes, as far as I had the facts before me.

The CHAIRMAN. And if there are no contradictions, then you stand by the whole statement made in all three of these reports?

Admiral WALKER. If there are no contradictions, I should say they were all right.

The CHAIRMAN. Do you remember any point or fact upon which you have changed your opinion with regard to this work from the beginning, from the time you first went to look at it—any point of fact upon which you have changed your opinion?

Admiral WALKER. Well, that would be pretty hard to answer. I went into the thing with my sympathies and prejudices, as far as I had any, in favor of the Nicaragua line, but I endeavored to take hold of this question with a mind open to proof.

The CHAIRMAN. I have no doubt that is so, but I want to know whether you have changed your mind upon any fact.

Admiral WALKER. I have changed it to this extent, that I now think that the best line is the Panama line, if that is a fact. That is an opinion; I do not think it a fact.

The CHAIRMAN. In an engineering sense?

Admiral WALKER. Yes; in an engineering sense.

The CHAIRMAN. Well, you come to that conclusion without changing any facts in your former statements?

Admiral WALKER. Yes.

The CHAIRMAN. Your judgment is convinced that you were in error in the first statement?

Admiral WALKER. No, sir; not at all. I have not changed my mind a particle.

The CHAIRMAN. How could you come to the conclusion this is the best canal when you recommended the other?

Admiral WALKER. Because when we recommended the other one I voted in favor of the Nicaragua route as being the most feasible under the conditions that then prevailed.

The CHAIRMAN. What conditions?

Admiral WALKER. When I voted in favor of the Panama route it was under quite different conditions.

The CHAIRMAN. What conditions do you refer to?

Admiral WALKER. Very largely the unreasonable price that the Panama people asked for their property.

The CHAIRMAN. Is it not exclusively that?

Admiral WALKER. I can not say that it is exclusively that. That is mainly the case.

The CHAIRMAN. If it is not exclusively that, please state any fact that you have changed your opinion about or your knowledge of since the time you made your preliminary report.

Admiral WALKER. I don't think of anything—I do not go back to the preliminary report at all; I am dealing with the report.

The CHAIRMAN. Well, the final report.

Admiral WALKER. I think of nothing except that difference of price that changed my mind between those two reports—the report and the supplemental report.

The CHAIRMAN. So that the whole question in your mind now, upon which your mind has had this change, relates to the price at which we can get the Panama Canal?

Admiral WALKER. I think that the engineering features of the Panama route are better than those of the Nicaragua route, although both routes are feasible. I think that if the French company had come forward with a direct offer and a reasonable offer for their property the report itself would have been in favor of the Panama route.

The CHAIRMAN. You think so?

Admiral WALKER. I think so.

The CHAIRMAN. Have you polled the committee to find out whether that is so or not?

Admiral WALKER. No, sir; I have not.

The CHAIRMAN. Well, we will have them before us and we will get their individual statements.

Admiral WALKER. I have no doubt you will, and I have no doubt you will find members of the Commission that would have voted in favor of the Panama route if the price offered at the present time had been offered at that time.

The CHAIRMAN. I have no doubt about that—that there are members who made up their minds before investigating.

Admiral WALKER. I do not think, Senator, that you should reflect upon the members of the Commission—able and honest men.

The CHAIRMAN. I am not reflecting upon them. You are very free in the statement of your opinions and so am I.

Admiral WALKER. I stated that if they—the French—had made a better offer, a reasonable offer, they might not have had an unfavorable report, but that has nothing to do with the Commissioners making up their minds before they had examined the matter. The one is my personal opinion on a matter upon which I have a right to have an opinion, the other a reflection upon the Commission entirely unwarranted.

The CHAIRMAN. How many days did your Commission spend in the Isthmus of Panama?

Admiral WALKER. We were there about two weeks.

The CHAIRMAN. You have not been back since?

Admiral WALKER. No, sir.

The CHAIRMAN. Has any member of the Commission been back since?

Admiral WALKER. Not to Panama.

The CHAIRMAN. Well, in two weeks' time you did not undertake, I suppose, to obtain an accurate knowledge of the engineering and of all of the conditions of that canal and the country through which it passes?

Admiral WALKER. Yes, we had a very good knowledge of the matter from having examined the French data with great care; we had our own working parties on the Isthmus of Panama and then the whole Commission, with the exception of one member, spent fifteen or sixteen days—I can not say exactly, about two weeks—on the Isthmus. We had a locomotive and special car every day to take us back and forth along the line, so that we lost no time, and we devoted ourselves to that work every day that we were there. We went over every inch of the line and we went up the Chagres River, above Alhajuela, where the French had projected a dam for a reservoir in the upper Chagres.

The CHAIRMAN. Did you go up in boats or on horseback?

Admiral WALKER. We went up on horseback and came back in boats.

The CHAIRMAN. Well, you say you made an examination of the French surveys before you went to the canal?

Admiral WALKER. Yes.

The CHAIRMAN. Where did you examine them?

Admiral WALKER. In Paris. We spent about a month in Paris, working every day, usually two sessions a day, with the officers of the French company, who laid everything before us. We received all of the information that can come from papers, profiles, and maps, and then we went to the Isthmus in person to supplement that information.

The CHAIRMAN. Was it that information that you derived in Paris as to the engineering on this canal that enabled you to go on and project your plans for the building of a canal there?

Admiral WALKER. We made our plans for the building of a canal after we had examined this data and after we had personally visited the Isthmus and been over the ground with great care day after day, and after we had received the reports of our working parties on the Isthmus.

The CHAIRMAN. You did not undertake to make an independent survey of that canal line?

Admiral WALKER. No, sir; we did certain things independently. For instance, we bored the site of the Bohio dam most thoroughly, much more thoroughly than the French had bored it. So far as what is ordinarily called surveying, topographical work, we did enough of it to convince ourselves that the French work was good and that we could accept their work as our own.

The CHAIRMAN. Well, you did adopt it.

Admiral WALKER. We did adopt it after convincing ourselves of its accuracy.

The CHAIRMAN. Is that the engineering and those maps and charts and records for which it is proposed to pay \$2,000,000 to the French?

Admiral WALKER. Their maps and plans and engineering data of all kinds is what we estimate to be worth \$2,000,000 and that they asked, I think, \$3,500,000 for.

You must understand that after we had examined this subject and made up our minds with regard to it, our plan of canal is different from the French plan and that we took out all of our quantities independently

of the French entirely; the work was based on their surveys, they gave us facts, so far as surveys were concerned, and we took our own total quantities and applied our own unit prices to the quantities and got out our figures independent of the French entirely.

The CHAIRMAN. But the basis of that survey and the basis of your calculation and plan was the French survey?

Admiral WALKER. No; we accepted their survey after checking it enough to be sure that it was right, and then after that our work was our own.

The CHAIRMAN. But based on that?

Admiral WALKER. Well, based on their surveys, if you like.

The CHAIRMAN. That is what I mean. Now, about how much money have we spent on the different routes? I mean on the different surveys of the Nicaragua route and the maps, and all that?

Admiral WALKER. I can not tell you that. That goes back a good many years.

The CHAIRMAN. Do you think it would aggregate \$2,000,000?

Admiral WALKER. I should think much more. I have been on commissions in the last four and a half years that have spent \$1,300,000, and a large portion of that has been devoted to Nicaragua.

The CHAIRMAN. Then the adoption of the Panama route would necessarily imply the throwing away of these more than \$2,000,000 that have been expended on the Nicaragua route.

Admiral WALKER. No, sir; not at all.

The CHAIRMAN. Why?

Admiral WALKER. Because it is money very well spent to satisfy ourselves of what we can do in Nicaragua and whether that is or is not the best route.

The CHAIRMAN. But we should never have any further use for it.

Admiral WALKER. Perhaps not, but it is money very well spent, to make sure we do not want to use it.

The CHAIRMAN. So that the surveying, if we pay \$2,000,000 to the French company for their maps and charts—the surveying of the two routes, one-half of which would be available, would be over \$4,000,000

Admiral WALKER. Perhaps so; I do not know; but you must remember that of this \$1,300,000 I speak of, some was spent on Panama and some on the Darien routes, but a greater portion was spent in Nicaragua.

The CHAIRMAN. You say you made a very much more thorough examination of the Bohio dam than the French have?

Admiral WALKER. We made a much more complete set of borings of that locality.

The CHAIRMAN. Well, did you take their levels and their other lines of engineering as a basis upon which you laid down——

Admiral WALKER. We ran our own line of levels.

The CHAIRMAN. At Bohio?

Admiral WALKER. We ran our own lines of levels across from one ocean to the other.

The CHAIRMAN. What borings did you make at Bohio?

Admiral WALKER. I can only tell you that we made a great many on various lines to try and find the best location for the dam.

The CHAIRMAN. I speak of the particular site upon which you have located Bohio dam.

Admiral WALKER. We bored first the site upon which the French had determined to put a dam, and then we bored above it and below it for

a considerable distance, running lines across the river to see whether we could find anything better—if we could find a point where the geological valley, as it is called, was not so deep—if we could get the rock foundation without going to such a great depth.

Finally, the site that the Commission determined upon as the best is some distance below the French site. The French put theirs in the narrowest part of the valley.

The CHAIRMAN. Now, confining yourself, Admiral, to the site on which the Commission have agreed to put the dam at Bohio, you made your borings across the stream?

Admiral WALKER. Yes.

The CHAIRMAN. How far back from either shore of the stream?

Admiral WALKER. We developed the geological valley. The valley goes down in that way—like the letter V or the letter U, or flatter—and we ran lines of borings from one side to the other across. Sometimes the depth of the valley did not coincide with the channel of the river at all.

The CHAIRMAN. About what distance across were those borings?

Admiral WALKER. They were put down a short distance apart, depending on what we found.

The CHAIRMAN. Who supervised the borings?

Admiral WALKER. We had two men down there. We had two separate boring parties there at different times. First, the man in charge was an engineer by the name of C. L. Harrison, a very capable man, who is now employed by the Denver Water Company in building a great dam for that company in one of the gorges west of Denver, for the waterworks for that city, a dam to be 250 feet high.

The CHAIRMAN. And the other one?

Admiral WALKER. The other was a man by the name of R. C. Smith.

The CHAIRMAN. Do you know where he is?

Admiral WALKER. I don't know where he is.

The CHAIRMAN. Did these two men bore on the same line across?

Admiral WALKER. No, sir; they bored in different places.

The CHAIRMAN. Who bored the line on which you located the dam?

Admiral WALKER. I think that was bored by Mr. Smith.

The CHAIRMAN. That was after the Commission had left?

Admiral WALKER. They were boring before the commission arrived there at all; the party came home and when we came to develop the result of their borings, put them all on paper, we found some points we did not think sufficiently developed, and Mr. Smith was sent back to make another lot of borings at other points.

The CHAIRMAN. Well, did Mr. Smith's final borings furnish the data as to borings upon which you located this dam?

Admiral WALKER. For that particular line, yes, sir.

The CHAIRMAN. The dam, therefore, is located upon the borings that Smith made.

Admiral WALKER. Yes; that is my recollection.

The CHAIRMAN. What distance apart are those borings?

Admiral WALKER. I can not say now; perhaps 100 feet apart.

The CHAIRMAN. Well, is that an assurance, an engineering assurance, that the rock is solid clear across and the borings are 100 feet apart?

Admiral WALKER. If he gets rock at a reasonable depth all the way across, that would be sufficient proof there was rock all the way across and that the line had developed it.

The CHAIRMAN. Would it be proof in this valley we speak of, this geological valley, that it was solid rock clear across?

Admiral WALKER. Yes; it would be so considered; but before any engineer started to build such a dam he would undoubtedly put boring parties in on that line and develop it with great care, putting down borings much closer in order to be absolutely sure of his ground. I think Mr. Harris will agree with me on that.

The CHAIRMAN. That is before he would commence building?

Admiral WALKER. Before he would commence work.

The CHAIRMAN. He would put in a great many more borings than are there now?

Admiral WALKER. That would be the case, I expect, of any dam site selected by either route.

The CHAIRMAN. You have stated all you know, I suppose, as to the borings at that line made by Mr. Smith, on which you have located the Bohio dam. Is there anything else you want to state?

Admiral WALKER. There is nothing that I think of that is of the slightest consequence to the committee.

The CHAIRMAN. It is on that predicate that you advise the Government of the United States to commence building a dam 128 feet below sea level for the purpose of damming the waters of the Chagres?

Admiral WALKER. We made an estimate on that dam in the way we did as an estimate, in the first place, as a dam that would be absolutely safe and as an estimate that would be certainly enough. Now, if we should take up the construction of a canal by the Panama route, I have no doubt that the engineers who are engaged in the construction would examine the dam site with great care, and they might modify the plans of the dam very considerably.

That would be a matter which goes with construction. We developed the ground for this preliminary purpose quite enough, as much as such things are ever done. The depth of 128 feet is the extreme at one point only.

The CHAIRMAN. But Congress in adopting the route and in voting appropriations to build it must act upon what is known and not on what is conjectural.

Admiral WALKER. In any great work of that kind there is a good deal that is conjectural. If we never did anything unless we were perfectly positive as to every detail before beginning, we should never get ahead at all.

The CHAIRMAN. Do you feel absolute confidence in the ability of men to construct a dam of stone 128 feet below the sea level at the point where Mr. Smith made these borings?

Admiral WALKER. I have no doubt a masonry dam could be built there, but a masonry dam is not what we are proposing to build. We propose to put in a concrete core and bury that in an earth dam.

The CHAIRMAN. Describe what a core is.

Admiral WALKER. The idea is to put in a concrete core; that is, a small concrete dam across the deep part.

The CHAIRMAN. No stone in it?

Admiral WALKER. No stone in it; made of concrete, which is artificial stone, you know, and when we get that to a sufficient height, making a tight joint with the rock below, we bury this core in earth and rock and everything that comes from our cuts. The core is simply to stop the seepage, prevent water leaking through under the dam.

The CHAIRMAN. Has a concrete core, such as you describe, sufficient strength to resist the waters of the Chagres?

Admiral WALKER. The pressure would not come on that core. The pressure would come on the great earth dam.

The CHAIRMAN. I am asking whether the concrete dam would be sufficiently strong to resist the pressure of the waters?

Admiral WALKER. That would depend on the size of the dam entirely. On the other route we propose to build the whole dam of concrete—on the Nicaragua route.

The CHAIRMAN. Why not build it all of concrete at Bohio?

Admiral WALKER. It would make it very expensive, and is not considered necessary.

The CHAIRMAN. You make the core and then you put what on the outside of that core?

Admiral WALKER. Earth and rock, everything that comes out of the cuts in the neighborhood—run it right in over the dam on trestle work and dump the cars; just as you build an embankment anywhere.

The CHAIRMAN. That, then, is riprap?

Admiral WALKER. No, sir; because it would be earth, and clay, and stone, and everything else.

The CHAIRMAN. Riprap is stone only?

Admiral WALKER. Yes.

The CHAIRMAN. A riprap dam would be the strongest.

Admiral WALKER. It might be strong enough, but it would not be tight.

The CHAIRMAN. Suppose you made it tight by putting clay in it?

Admiral WALKER. Well, if you got clay enough in it it would make it tight.

The CHAIRMAN. It would be tighter and stronger than a dam of clay alone?

Admiral WALKER. No, sir; not necessarily. That would depend on the size of your dam. Of course, if you dumped enough material across the stream, really, to make an artificial hill or mountain, it would be strong enough to stand anything.

The CHAIRMAN. Now, in the survey made by the Commission in Nicaragua, the details were such that engineers could go to work and build a canal now, could they not?

Admiral WALKER. Hardly that. There would be a good deal of engineering detail work to do—more detailed examination of places.

The CHAIRMAN. The canal is located—the actual line?

Admiral WALKER. Yes; the canal is located and it is bored from ocean to ocean, but there would still be an enormous amount of engineering work to be done. Probably the first thing to be done would be to put engineers in there to examine the line and see if anything better could be found or if any advantage could be derived from changing the line a little; there would be a great deal of work to be done and, very likely, a good deal more boring to be done to make perfectly sure that the Conchuda dam site and the lock sites are all right.

The CHAIRMAN. In recommending the Nicaragua Canal, did you recommend it as a canal upon which there could certainly be made a construction of dams and locks of sufficient height and strength to make it useful?

Admiral WALKER. We thought so.

The CHAIRMAN. In the plan at Panama, did the Commission agree that no dam at Alhajuela was necessary?

Admiral WALKER. It was thought best not to estimate for a dam at Alhajuela. It was believed by most of the Commission, perhaps all of the Commission, that one was not necessary, but that if in the future there was any trouble about water in the dry season or any trouble with floods in the wet season that a dam at Alhajuela could be readily put in and would serve to control the floods and also to store water.

The CHAIRMAN. Did you ascertain what would be the cost of such a dam?

Admiral WALKER. We made no estimate of that. I think the French have an estimate.

The CHAIRMAN. What is the French estimate?

Admiral WALKER. I don't remember what it is; it will cost money to build, of course, but it is a perfectly easy dam to build; it is on rock and across a narrow gorge.

Senator HARRIS. About what would that cost?

Admiral WALKER. I can not say what it would cost. The French have an estimate for it; I don't remember what it was. I do not think we made an estimate on it, but it would cost a million or two, perhaps more. The dam put in there would probably be a concrete dam.

The CHAIRMAN. On page 99 of the report you sum up the whole cost of building the Panama Canal at \$144,233,358. Does that include the dam at Alhajuela, or conduit?

Admiral WALKER. It does not.

The CHAIRMAN. So that if that must be built hereafter, the cost of that will have to be added to it.

Admiral WALKER. If that was built hereafter, it would be an additional cost. There is no estimate in our report for a dam at Alhajuela.

The CHAIRMAN. Or a conduit?

Admiral WALKER. We do not have a conduit in our plan. We raise the level of Lake Bohio above the French plan and excavate the Culebra Cut deeper, so as to make Lake Bohio the upper level.

The CHAIRMAN. Do you recollect whether all the Commission agreed to take out the conduit?

Admiral WALKER. Yes, sir; all.

The CHAIRMAN. Some of them contended it was necessary in any event, did they not?

Admiral WALKER. I do not know of any member of the committee who advocated retaining the conduit.

The CHAIRMAN. In constructing a permanent dam at Bohio, which you say will take eight years, passing through eight rainy seasons, is it necessary to first construct a temporary dam at or near the permanent dam?

Admiral WALKER. I presume it would be, but I should rather have the technical engineers pass upon that.

The CHAIRMAN. Do you think it would be possible?

Admiral WALKER. If the foundations are put down by the pneumatic method, a temporary dam might be avoided, but I should think it would be well to have it as a measure of safety.

The CHAIRMAN. Do you think it is possible to build a permanent dam at Bohio without fencing off the waters of the Chagres River in the rainy season?

Admiral WALKER. A temporary dam would do that. The French scheme, you know, was to put in a temporary dam and let the waters of the Chagres go through the cut made for the locks; whether that would be enough is a question; if not, it would have to be raised so as to escape by the Gigante Spillway.

The CHAIRMAN. But a temporary dam in some form would be necessary in order to enable you to build the permanent dam?

Admiral WALKER. I should rather leave that to the engineers. I do not pass an opinion on that. I should think most probably a temporary dam would be necessary.

The CHAIRMAN. What would be the cost of a temporary dam there

that would fence off the waters of the Chagres and enable you to build a permanent dam?

Admiral WALKER. I can not give an estimate on the cost. That is out of my line.

The CHAIRMAN. It would cost more than \$1,000,000?

Admiral WALKER. Perhaps.

The CHAIRMAN. That is not in your estimate of the cost of the Bohio dam?

Admiral WALKER. No, sir.

The CHAIRMAN. You have omitted entirely any temporary structure?

Admiral WALKER. That is what I understand.

The CHAIRMAN. Did you have any survey made for a temporary dam?

Admiral WALKER. No, sir.

The CHAIRMAN. You made no provision for it whatever?

Admiral WALKER. We made no survey for any dam; we merely bored the locations.

The CHAIRMAN. In constructing a canal between Bohio and Obispo would you begin by digging out the canal trench to its proper width and depth?

Admiral WALKER. I don't know what I should do. That would depend on circumstances.

The CHAIRMAN. Would you find it necessary to have a channel between Bohio and Obispo dug out?

Admiral WALKER. Not necessarily at first.

The CHAIRMAN. Why?

Admiral WALKER. Because we would not want to pass anything through it. I do not know why we should be in any particular hurry to get that part of the work done. The points upon which work would be most concentrated would be the great cut which leads through from Obispo to Pedro Miguel and then the work on the dam.

The CHAIRMAN. You mistake my question. I want to know in the construction of a canal across the Isthmus would it be necessary to dig a channel between Obispo and Bohio?

Admiral WALKER. Yes; there is a small space before reaching Obispo where the channel would have to be deepened, if I recollect right. Most of the lake would be deep enough, so that nothing would need to be done, but as you approach Obispo I think there would be one or two places in the lake where there would be some deepening of the channel required. That would probably be done before the dam was constructed, because it might be done cheaper, but that is a matter of detail.

The CHAIRMAN. When you speak of deepening the channel, do you mean deepening the channel of the Chagres River?

Admiral WALKER. No, sir; deepen the channel of the canal.

The CHAIRMAN. Well, that is the very point I was trying to get at, as to whether you would have to dig the canal between Obispo and Bohio.

Admiral WALKER. Most of the way there would be deep water, as there is in the middle of Lake Nicaragua plenty of water for ships, but as you approach Obispo there is a small amount of excavating that would be necessary before reaching the point where the channel enters this great cut known as Culebra. That is, it would start in what would afterwards be a lake; you would have to have water enough as you came through the lake and approached the cut to float your vessels along.

The CHAIRMAN. Is there a rim of hills around that lake?

Admiral WALKER. There is land sufficiently high to hold the water; there are hills, a broken country.

The CHAIRMAN. About what area?

Admiral WALKER. The area of the lake is some thirty-odd miles.

The CHAIRMAN. Square miles?

Admiral WALKER. Yes.

The CHAIRMAN. Did you make a survey around that rim?

Admiral WALKER. No, sir; that had been done by the French.

The CHAIRMAN. You accepted the French survey?

Admiral WALKER. We accepted their survey.

The CHAIRMAN. Had they located a lake there?

Admiral WALKER. Oh, yes.

The CHAIRMAN. As large as the one that you have?

Admiral WALKER. Not quite as large as the one that we propose. We propose to raise the water more than in their plan, and that increases the size.

The CHAIRMAN. How could you tell whether you could raise the water if they had not surveyed it?

Admiral WALKER. The French engineers had run a line around it, so that they knew the height of ground; there is no trouble about that; there is plenty of height.

The CHAIRMAN. But they surveyed it for a smaller lake?

Admiral WALKER. They ran contour lines around the lake, showing the height.

The CHAIRMAN. But for a smaller lake.

Admiral WALKER. They proposed a smaller lake.

The CHAIRMAN. Now, about the contour for the larger lake. Was that run?

Admiral WALKER. We did not run it. The French contour lines show the elevations of the ground all the way around, so that we know just what it is. We did not run the contours.

The CHAIRMAN. Well, does the French survey show the contour line for the larger lake which you propose there?

Admiral WALKER. They show the contour lines on the ground around, and we can raise the lake to any height we please, so that we do not get high enough to have the lake run away from us.

The CHAIRMAN. In that contour line you found a depression near the headwaters of the Gigante River or creek?

Admiral WALKER. Yes.

The CHAIRMAN. Everything is called a river out there, is it not?

Admiral WALKER. In Central America a small creek is often called the grand or the great river.

The CHAIRMAN. You found a depression near the headwaters of the Gigante?

Admiral WALKER. Yes, sir.

The CHAIRMAN. You found that on the French surveys?

Admiral WALKER. Yes, sir.

The CHAIRMAN. You did not make any survey?

Admiral WALKER. We did not make a survey. We went out there and examined the ground ourselves and we had it bored, had the line of the Spillway bored.

The CHAIRMAN. Did you find a rock bottom?

Admiral WALKER. We found rock everywhere.

The CHAIRMAN. Clear across the Spillway?

Admiral WALKER. Yes, sir.

The CHAIRMAN. There you construct a Spillway?

Admiral WALKER. Yes, sir.

The CHAIRMAN. And you carry the waters into the Gigante Creek?

Admiral WALKER. We carry them over the ridge down into a swamp called the Pena Blanca Swamp.

The CHAIRMAN. Does the Gigante run into that?

Admiral WALKER. No, sir; it runs the other way.

The CHAIRMAN. And then you carry it from that to another swamp?

Admiral WALKER. It goes through from there to another swamp and so on toward the sea.

The CHAIRMAN. Do you bring it back into the Chagres River?

Admiral WALKER. We keep it away from the canal and then let it go where it pleases. We do not care where it goes, so that it is kept away from the canal.

Senator HAWLEY. I have some Military Committee business at this time, and I would like to be excused.

The CHAIRMAN. Yes; I will count you as being present, of course. Now, Admiral, at Gatun, or somewhere down there—it is at or near Gatun—there is a channel cut for the Chagres River in your plan.

Admiral WALKER. There was a diversion to carry off part of the water.

The CHAIRMAN. Where does that water come from?

Admiral WALKER. From the Chagres and the hills on that side.

The CHAIRMAN. Which side?

Admiral WALKER. On the east side.

The CHAIRMAN. On the right bank?

Admiral WALKER. Yes.

The CHAIRMAN. And that goes over the Gigante spillway and goes out to the sea somewhere through the swamps, if I understand you?

Admiral WALKER. The water that goes over the spillway finds its way out through the lower Chagres eventually.

The CHAIRMAN. But it all gets back into the Chagres River.

Admiral WALKER. Before it gets to the sea, it will probably mostly get back into the Chagres, but lower down.

The CHAIRMAN. When you get down to Gatun, you have to cut a channel there to make the diversion of the Chagres.

Admiral WALKER. The French have cut a channel—they proposed in the old days taking the spare water from the Chagres through two diversions, one on each side of the canal. They cut that diversion. It will be utilized to take any water that comes from that side, and that might give trouble to the canal—it will be taken into that diversion and carried off to the sea. It is like a ditch on the side of a railroad. It stops the water coming toward the railroad, catches it in the ditch and runs it off.

The CHAIRMAN. Here is what you say about it on page 97 of the report:

The present surface of the Agua Clara swamp is at elevation 11.5, and its area at that level is about 2.9 square miles. Farther on are other swamps—Vino Tinto and the Bruja. The ground separating them from each other and from the line of the canal is low, affording a wide area for the spread of flood waters, until the neighborhood of Gatun is reached. Here the width of the valley contracts and its direction changes, so that an artificial channel becomes necessary to divert the Chagres.

I wanted to ask you if that statement refers to the waters that would pass through the Vino Tinto and the Bruja.

Admiral WALKER. This is referring, as I read it here, to the work of the old company. The channel was cut there by the old canal company, but it was of inadequate dimensions, and was given an awkward

shape. We should cut a new channel; that is, enlarge the old channel and cut a new channel wherever it was necessary.

The CHAIRMAN. Why is it necessary to cut a channel there at all to control the waters of the Chagres River if you have diverted them through the lake?

Admiral WALKER. The overflow from the spillway of the Gigante comes down through those swamps, and the valley narrows at this point and it is necessary to cut a diversion through there to let it escape, so that it will not threaten the canal.

The CHAIRMAN. That is the precise point I was trying to get at, but what I thought you meant in the report here that those waters come back into the Chagres at this point we are now discussing, and the gorge being narrow, it was necessary to enlarge it to let those waters out. Is not that the fact?

Admiral WALKER. The purpose of that cut is to widen the water space so as to let the water go off freely and not endanger the canal.

The CHAIRMAN. So that the waters that would pass through Lake Bobio across the Gigante Spillway through those swamps comes back at this point and it was necessary to enlarge the channel there so as to let them off.

Admiral WALKER. Yes.

The CHAIRMAN. On page 95 you say:

The canal in the low region above and below Gatun must be protected from overflows by levees, their total length aggregating about 5.4 miles.

Are there any banks on the district indicated at this time?

Admiral WALKER. Will you read that over again, please?

The CHAIRMAN. "The canal in the low region above and below Gatun must be protected from overflow by levees, their total length aggregating about 5.4 miles."

I have got it marked as on page 98.

Admiral WALKER. Yes; I see where it is, near the top of page 98.

The CHAIRMAN. Are there any banks on the side of that canal in the district indicated at this time?

Admiral WALKER. There are levees all along the old canal that was cut there, but in places they have been cut through by the river. Of course it has been neglected for years past.

The CHAIRMAN. In other places have they not either sunk or dispersed from the surface of the—

Admiral WALKER. They may have; I can not say about that. They have been more or less injured by the river and by neglect. Those levees would be made from excavated material; as the excavations were made to deepen the canal it would be piled up in the levees, and the levees would be made very large so as to make everything absolutely safe.

The CHAIRMAN. When you mention, on page 99 of the report, \$1,929,982 as the estimated cost of the Chagres diversion and the Gatun diversion do you refer to the ditches that must be dug above and below Gatun to keep the water out of the canal?

Admiral WALKER. That refers to whatever is necessary to divert the Chagres there, whatever is necessary in the diversion of the Chagres to keep it out of the canal.

The CHAIRMAN. The canal there follows practically the bed of the Chagres?

Admiral WALKER. No, sir; it is near the Chagres, but wherever it is necessary to divert the Chagres or to do any work to keep the water away from the canal, it is estimated for. You see the Gatun diversion is estimated at only \$100,000 here, to clear out and put it in order.

The CHAIRMAN. At what point of this line is the 5.4 miles of embankments that you speak of in your report?

Admiral WALKER. They are in the lower valley, on the sea level, part of the canal.

The CHAIRMAN. Are there any embankments there?

Admiral WALKER. There are some embankments along the line there, but they are not in good condition. As I say, in places they have been cut through. The canal would have to be enlarged and deepened to meet our present requirements, our present plan, and the material that would be taken out of the canal would be piled up in the shape of levees to protect the canal from any possibility of water getting into it, to its injury.

The CHAIRMAN. You would have a bank on either side of the canal, of course.

Admiral WALKER. Wherever it was necessary we would. In some places we would need levees and others we would not. Wherever it passes through land sufficiently low to require levees we should build them.

The CHAIRMAN. Your estimates include those banks?

Admiral WALKER. Yes, sir.

The CHAIRMAN. For the whole distance?

Admiral WALKER. Wherever they are needed; the estimate covers everything necessary.

The CHAIRMAN. For the whole distance?

Admiral WALKER. Wherever they are needed.

The CHAIRMAN. The estimates you have submitted to the Government makes them continuous on both sides of the canal.

Admiral WALKER. Not at all; it only puts them where necessary.

The CHAIRMAN. Making it in all 10.8 miles.

Admiral WALKER. Making it in all whatever the length may be.

The CHAIRMAN. Well, it is double 5.4.

Admiral WALKER. No; we might in places need them on one side of the canal and not on the other; we might need them on both sides of the canal in some places and in other places we might not need them at all. That depends on the contour of the ground.

The CHAIRMAN. Is this provision necessary in addition to the Gigante Spillway, which cost \$1,419,000, and the Pena Blanca Outlet, which cost \$2,448,000, in all \$3,659,495, for the protection of the canal against the Chagres River at all times, or only when it is in flood?

Admiral WALKER. If the river is low, the Gigante Spillway would not be in operation at all; neither would the channel through the Pena Blanca.

The CHAIRMAN. What is it about the level of the country above Gatun, as far as Bohio, above the level of the sea—about what is the level of the country?

Admiral WALKER. It is a low tropical country through which the canal passes, with hills on either side. On the east of it there are more or less hills; there are low hills about.

The CHAIRMAN. Is it not frequently covered with water?

Admiral WALKER. In the Lower Chagres country, in times of flood, there is more or less water in the swamps.

The CHAIRMAN. Below Bohio and out toward the sea, does the canal follow the river Chagres, and for about what distance?

Admiral WALKER. It leaves the course of the Chagres some distance from Colon. At some distance from Colon the course of the Chagres is more to the westward, and it passes into the sea, while the canal comes out into the Bay of Limon.

The CHAIRMAN. From that point of junction up to Bohio the canal line runs in the bed of the Chagres?

Admiral WALKER. No, sir; not at all. It is not in the bed of the Chagres at all or anywhere.

The CHAIRMAN. Near to it?

Admiral WALKER. It is near to the Chagres. Leaving Colon, it passes into the valley of the Chagres and finally reaches the neighborhood of the river. It continues in the neighborhood of the Chagres until it reaches Bohio. From Bohio it passes through a lake for some 12 miles, and really crosses the Chagres in crossing the lake; then it goes on through the great cut to Pedro Miguel.

The CHAIRMAN. How much of the canal below Bohio is silted up?

Admiral WALKER. No man can tell that without a careful examination. In places it is silted up a good deal and in other places it is quite deep. Where little streams have come into it they have brought in sediment, and between those places there is a considerable depth.

The CHAIRMAN. Did you make a careful examination to find out how much it had silted up?

Admiral WALKER. We had it examined in a general way, but I can not tell you how much it was silted up. It was deep in places and shallow in places. I went up and down it in a small steamer two or three times. When I was out there as a member of the Nicaragua Canal Commission I went over that part of the line in a small steamer, and again with this Commission.

The CHAIRMAN. You spoke about some ditching that would have to be done up at Obispo at the head of the lake, if I remember right.

Admiral WALKER. I said that in leaving the lake to go into the canal proper at the upper end of the lake there would have to be some excavation of the channel in the lake. That would be done in the dry, as we call it. I am not quite sure how far out that would go. I should have to examine the maps for that, but there would be a channel there which would afterwards be covered by the lake.

The CHAIRMAN. In forming the lake, would you take out the timber entirely—Lake Bohio?

Admiral WALKER. That would depend. If there was any timber in the way of the sailing line it would be taken out, but we should not bother with it anywhere else.

The CHAIRMAN. Nowhere except on the sailing line?

Admiral WALKER. No, sir. Of course if it was a mile away, either one side or the other of the sailing line, we would not care whether the trees were standing or down.

The CHAIRMAN. Has any test been made at all of the area covered by that lake, as to whether it will hold water?

Admiral WALKER. No; because there has been no water over it to hold.

The CHAIRMAN. There has been no test made of any kind at all.

Admiral WALKER. It would hold water as in the case of a dam built across a valley anywhere the water backing up and forming a lake; it would stay there if there was no saddle low enough for it to flow out.

The CHAIRMAN. You have not read the history of the dam at San Antonio, Tex.?

Admiral WALKER. I do not think I have.

The CHAIRMAN. Do you not know the manner in which that dam happened to be washed away and destroyed?

Admiral WALKER. No; I do not.

The CHAIRMAN. I am informed—of course, through the newspapers—

that it was done by percolation of water down through a stratum of earth or clay far above the dam. Might not that happen at Bohio?

Admiral WALKER. Newspaper information is not always of the best. That is a case that I should not want to guess on. I do not believe it would happen at Lake Bohio.

The CHAIRMAN. But you do not know anything about whether it would or would not.

Admiral WALKER. I have just as much reason to think it would as that Lake Nicaragua would run out.

The CHAIRMAN. Except that Lake Nicaragua has been there for ages and this has not.

Admiral WALKER. Lake Nicaragua, according to a so-called eminent geologist, is dropping away at the rate of several feet a year.

The CHAIRMAN. Do you believe that?

Admiral WALKER. I do not, but he has proved it satisfactorily to himself.

The CHAIRMAN. You do not use that as an argument against Nicaragua, because you do not believe it.

Admiral WALKER. No, I do not believe it; but I think that the water is as likely to run out of Lake Nicaragua as it is out of Lake Bohio.

The CHAIRMAN. In digging out great reservoirs for cities like New York and Washington and elsewhere, do you know if the bottom of it is always examined and puddled?

Admiral WALKER. It is examined and puddled if thought necessary.

The CHAIRMAN. If you can get no reservoir of water in Lake Bohio, you can not run that canal on your plan?

Admiral WALKER. It requires a lake there.

The CHAIRMAN. Is it not absolutely essential to the certainty of operation that we should know whether the Bohio basin is going to hold water or not?

Admiral WALKER. Have we any right to suppose that it would not hold water?

The CHAIRMAN. I am just asking you for your judgment. I am not an engineer or a commissioner. I am not recommending the Government to take your plan.

Admiral WALKER. I have never seen anything to make me suppose there was the slightest danger of its not holding water.

The CHAIRMAN. You made no inquiry about that?

Admiral WALKER. I did not make any inquiry about that. There are a great many things that I have not inquired about.

The CHAIRMAN. On page 93 you speak of the cut through Culebra Hill being lined with masonry walls to the height of 92 feet above high water.

Admiral WALKER. Yes, sir.

The CHAIRMAN. Now, what is the meaning of "high water" there?

Admiral WALKER. Sea level.

The CHAIRMAN. Ninety-two feet above sea level.

Admiral WALKER. Yes, 92.2 feet above sea level.

The CHAIRMAN. Well, you say those walls are to have vertical faces. Does that mean that they are to be perpendicular or that they are to lean to or rest upon the slope of the cut?

Admiral WALKER. They would be nearly perpendicular. The face would probably slope back a little from the perpendicular.

The CHAIRMAN. The object is to have them rest against the walls of the cut?

Admiral WALKER. No, sir; the object is to protect the side of the cut from disintegration in water.

The CHAIRMAN. Then you would build them on a curve?

Admiral WALKER. No, sir; just put in a heavy wall like a heavy bank wall.

The CHAIRMAN. But not on a perpendicular?

Admiral WALKER. Practically perpendicular; yes, sir.

The CHAIRMAN. Well, if practically perpendicular, and the cut of the canal sloped off from it, they would not sustain the slope, would they?

Admiral WALKER. This wall would come up vertical to a little above the surface of the water in the cut. Then there will be a broad bench, which, if I recollect right, is about 38 feet broad; a broad, flat bench. Then comes the slope of the cut.

The CHAIRMAN. Then you do not propose to line the slope of the cut at all.

Admiral WALKER. No, sir.

The CHAIRMAN. In one of your statements you said that you did.

Admiral WALKER. No; I think not. I have never known myself to make such a statement.

The CHAIRMAN. As to the lining of the cut?

Admiral WALKER. Yes, sir; I stated that it might be possible that there would be places where we might need to protect the slopes of the cut by concrete.

The CHAIRMAN. Yes; you stated that also.

Admiral WALKER. To prevent any harm—might or might not; that is frequently done.

The CHAIRMAN. This wall that you speak of is a wall on both sides, either side of the canal?

Admiral WALKER. Yes; it is a wall on either side of the channel through the heavy cut.

The CHAIRMAN. Does it stop at the berm of the bench that you put there?

Admiral WALKER. Yes; I think 4 feet above the water, if I recollect right.

The CHAIRMAN. How deep would that wall be then?

Admiral WALKER. It would go down to the bottom.

The CHAIRMAN. How deep would it be?

Admiral WALKER. In that case it would be about 40 feet deep.

The CHAIRMAN. For what length, distance, through the Culebra and Imperador cuts there would these walls be built?

Admiral WALKER. We should build it as far as necessary through the heavy Culebra cut. I do not remember what the distance is. I do not know that we give the distance anywhere.

The CHAIRMAN. Perhaps I can refresh your memory about it. You said the distance was seven miles.

Admiral WALKER. When did I say that?

The CHAIRMAN. In one of your statements. That is my recollection.

Admiral WALKER. Yes; but we frequently speak of the Culebra cut, which is the short cut, and of the Imperador cut, which is the same in fact, a continuation of Culebra, but not so heavy a cut.

The CHAIRMAN. I understand that.

Admiral WALKER. We frequently speak of both as one cut; we speak of Culebra cut meaning the whole thing.

The CHAIRMAN. Well, through the whole distance these walls would go.

Admiral WALKER. I am not sure whether we figured on a wall for the whole distance or not; I can not say positively as to that. Of

course, I did not make the calculation; that was done by the engineers, and I am not quite sure what the length of the wall was.

The CHAIRMAN. Why would you lean these walls coming up from the bottom of that canal?

Admiral WALKER. They are practically vertical walls. They would be probably a little heavier at the bottom than at the top, which would make them vary a little from the vertical.

The CHAIRMAN. What is the thickness of that wall at the bottom?

Admiral WALKER. I can not tell you.

The CHAIRMAN. At the top?

Admiral WALKER. I can not tell you. For all those details I should have to go to our data.

The CHAIRMAN. What particular feature of danger in the construction or operation of the canal was provided for by putting these walls in there?

Admiral WALKER. The statement is made here in our report that the material disintegrates in water, and to prevent any trouble in that cut after it is filled with water it is proposed to build these walls on either side, so that the water does not get to that material and dissolve it and take it away.

The CHAIRMAN. Then your object is to build walls right against the banks?

Admiral WALKER. Yes, sir.

The CHAIRMAN. And exclude the water in that way.

Admiral WALKER. It takes the wash of the water from steamers passing through and all that sort of thing, the wash is taken by the stone wall instead of by the earth.

The CHAIRMAN. You do not propose to pave the bottom of the canal?

Admiral WALKER. No, sir.

The CHAIRMAN. How do you keep that from disintegrating in water?

Admiral WALKER. We do not care if it does.

The CHAIRMAN. Suppose it disintegrates and washes it out and lets your walls down?

Admiral WALKER. Then we will have a deeper canal.

The CHAIRMAN. How about your walls?

Admiral WALKER. I do not think there is any danger of letting the walls down.

The CHAIRMAN. We can not treat this subject very lightly. There is a possibility of its washing it out. What would become of the walls in the event that the bottom of the canal washes out?

Admiral WALKER. If it washed out sufficiently, which it never will, the walls would fall down.

The CHAIRMAN. Yes; that is what I supposed. Was the railroad of the Panama Railroad Company laid originally through the same cut in the Culebra hill now occupied by the canal route?

Admiral WALKER. No, sir.

The CHAIRMAN. Where was it? How far from the canal line when it was originally put down?

Admiral WALKER. It was a short distance, perhaps a quarter of a mile.

The CHAIRMAN. Well, if it had never been through the place where the line of the canal is being cut now, what was the necessity for changing the location of that railroad?

Admiral WALKER. The work on the canal interfered with the location of the railroad, and they made a diversion of the railroad to get away from the canal.

The CHAIRMAN. How could that be, unless the line runs through the same place?

Admiral WALKER. Because it crosses the canal line they did not want it there in their way, and therefore they changed its location. It crossed the canal line just at the western end of the deep cut. It was very much in their way there, and they made this diversion and carried it off farther to the southward and westward on the same side of the canal it was already on.

The CHAIRMAN. Is the Culebra hill between the canal and the railroad?

Admiral WALKER. A portion of it is.

The CHAIRMAN. The same sort of structure on both sides of the Culebra hill?

Admiral WALKER. What do you mean by "structure?"

The CHAIRMAN. I mean geological.

Admiral WALKER. Oh, practically so, I suppose.

The CHAIRMAN. Is that just a single peak that rises up there or is it a continuous ridge?

Admiral WALKER. It is a ridge. It is the backbone of the continent.

The CHAIRMAN. The canal runs on one side and the railroad around it.

Admiral WALKER. The canal goes through it and the railroad goes through the lowest saddle. The railroad goes through a saddle lower than the ground on which the axis of the canal is located.

The CHAIRMAN. What is the greatest distance between the railroad and the canal through that hill?

Admiral WALKER. Perhaps a quarter of a mile—a very short distance.

The CHAIRMAN. You speak about draining the Culebra hill. What would be the method of draining it?

Admiral WALKER. I suppose they would ditch it.

The CHAIRMAN. How?

Admiral WALKER. They had trouble at one time, years ago, with the surface material sliding. They found that water soaked into it and it slid into the cuts. They found that after draining it there was no further slipping. That surface material will have to be drained and, as much as is necessary, removed.

The CHAIRMAN. It has to be either taken away or drained?

Admiral WALKER. Yes, sir; one or both.

The CHAIRMAN. As long as it remains there, it is a threat to the canal.

Admiral WALKER. Not if it is properly drained.

The CHAIRMAN. I want to know how it can be properly drained. I can not understand that.

Admiral WALKER. By leading the water off, not allowing it to stand on it. It is on top of a hill where it is very easy to run the water away.

The CHAIRMAN. How high above the level of the canal would it be where the drains would be put in?

Admiral WALKER. I do not know what the height of that hill is. About 330 feet above the sea level; the bottom of the canal would be about 55 or 60 feet above sea level. You would have to take one away from the other. It would be something under 300 feet.

The CHAIRMAN. Where would the drains be?

Admiral WALKER. Upon the surface of the hill; I do not know just where; that would be a matter that would have to be looked over on the ground.

The CHAIRMAN. Have you matured a plan for draining those hills?

Admiral WALKER. I did not.

The CHAIRMAN. Did your Commission mature a plan?

Admiral WALKER. No, sir; we looked over the ground and talked the matter over with the French engineers who were down there on the ground at work on the canal, and it was understood that there was nothing difficult about it.

The CHAIRMAN. But that it had to be drained?

Admiral WALKER. It might be necessary to do a certain amount of draining to prevent any danger from slipping.

The CHAIRMAN. How did it ever occur to you that there was any necessity for draining, unless you saw that there was some danger to be apprehended?

Admiral WALKER. Because, as I told you before, years ago they had some slides of this material, and they have stopped it by draining. It is a perfectly simple thing to do, as far as I understand it.

The CHAIRMAN. You say it is a simple thing to do. Where do those drains lead to?

Admiral WALKER. They lead down the hill and let the water find its way to the sea.

The CHAIRMAN. Down what hill?

Admiral WALKER. Down Culebra Hill, if that is the name of it. I don't know whether that is the local name or not.

The CHAIRMAN. Toward the railroad or toward the canal?

Admiral WALKER. Simply down the hill until it is far enough down to let it out and let it take its own course.

The CHAIRMAN. Well, you made no test to determine whether drainage was necessary or whether it would answer the purpose?

Admiral WALKER. There was no test necessary that we could see.

The CHAIRMAN. You made none?

Admiral WALKER. No, sir.

The subcommittee then (at 4 o'clock and 30 minutes p. m.) took a recess until Saturday, February 8, at 10 o'clock a. m.

WASHINGTON, D. C., *Saturday, February 8, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Hanna, and Mitchell. Also Senators Kittredge, Millard, and Harris, members of the committee.

ADDITIONAL TESTIMONY OF REAR-ADMIRAL J. G. WALKER.

The CHAIRMAN. I want to ask you some questions about the channel at Panama Bay. You say it is soft material. Do you mean it is soft from the anchorage clear in to the coast?

Admiral WALKER. There is a certain amount of it—all the upper part is soft material, but underlying that soft material is rock in places.

The CHAIRMAN. Is not that a coral reef that runs out there, or a coral bed?

Admiral WALKER. I do not know what the material is underneath. It may be coral, but it is rock of some kind, and a certain amount of it will have to be removed to get the channel that the Isthmian Canal Commission estimated upon.

The CHAIRMAN. What is the width of the channel that you estimated on?

Admiral WALKER. We start into the bay from La Boca, as it is called, with a bottom width of 200 feet and slopes of 1 on 3.

The CHAIRMAN. What depth?

Admiral WALKER. Thirty-five feet.

The CHAIRMAN. Below mean tide?

Admiral WALKER. Mean low water. If we were to take advantage of the tide we could make it 35 feet below mean tide, which would save a good deal of money in that channel.

The CHAIRMAN. With a channel of 35 feet dredged out and a tide of 20 feet you would have 55 feet of water there?

Admiral WALKER. We would at times.

The CHAIRMAN. When the tide comes in?

Admiral WALKER. At high water.

The CHAIRMAN. I suppose you would put buoys on the sides of the canal there—that submerged canal?

Admiral WALKER. It would be marked with buoys or with beacons—spindles. Both sides would be marked clearly.

The CHAIRMAN. If the sides of that canal thus submerged are rock, would there not be danger in time of a blow, or any kind of a fresh wind, of a ship running out of that channel?

Admiral WALKER. No particular danger; no more danger than there would be anywhere in a narrow channel.

The CHAIRMAN. At the width that you prescribe, of 200 feet, could ships pass?

Admiral WALKER. Yes.

The CHAIRMAN. In that channel?

Admiral WALKER. Yes.

The CHAIRMAN. With safety?

Admiral WALKER. Yes.

The CHAIRMAN. How long would that channel be, at a depth of 35 feet, to get out to deep water?

Admiral WALKER. We make it 4.41 miles, not quite $4\frac{1}{2}$ miles.

The CHAIRMAN. Is there any part of that channel now dredged?

Admiral WALKER. Oh, yes.

The CHAIRMAN. How much of it?

Admiral WALKER. It is dredged all the way out, but not to the depth that we estimate.

The CHAIRMAN. How deep and how wide is it dredged?

Admiral WALKER. I can not say now, but my impression is that it is 150 feet wide and to a depth of about 30 feet at mean tide.

The CHAIRMAN. Four and a half miles carries it out to an island.

Admiral WALKER. Carries it out to deep water inside of some islands. There are three or four little islands there which protect a roadstead. Little protection is needed. Those islands are owned by the Panama Railroad Company jointly with the Pacific Mail Steamship Company. The names of the islands are Naos, Culebra, Perico, and Flamenco.

The CHAIRMAN. In some part of your final report you state that the value of the work, excavation and embankment, whatever work has been done there, the value of it at present, to be used in the completion of the canal, is \$21,000,000.

Admiral WALKER. It is about \$40,000,000.

The CHAIRMAN. No, you say \$21,000,000.

Admiral WALKER. The total value of the Panama Canal property we sum up at \$36,324,033, to which we add 10 per cent, making it practically \$40,000,000.

The CHAIRMAN. Before that, in the same report, you say that the value

of the work done there in the way of removal of earth, etc., as it stands at present is \$21,000,000?

Admiral WALKER. \$27,474,000.

The CHAIRMAN. But at a previous place you stated that \$21,000,000. I want to find that place.

Admiral WALKER. If it is here we can find it.

The CHAIRMAN. Yes; it is here.

Admiral WALKER. I think what you refer to is on page 101.

Canal excavation	\$21, 020, 386
Chagres diversion	178, 186
Gatun diversion	1, 396, 456
Railroad diversion (4 miles)	300, 000

Total	22, 895, 028
To which is added for contingencies the usual 20 per cent, or	4, 579, 005

Making the aggregate..... 27, 474, 033

The CHAIRMAN. The value of the items of actual work done there is summed up here on page 101, at \$21,020,386 for canal excavation and \$178,186 for the Chagres diversion; \$1,396,456 for the Gatun diversion, and for the railroad diversion, 4 miles, \$300,000. That railroad diversion does not mean a diversion that has already taken place, does it?

Admiral WALKER. Yes, sir; it has already taken place. That is a part of the cost of the canal. They were obliged to divert the railroad in order to carry on the work of excavation through the Culebra cut.

The CHAIRMAN. But, as I understand it, we are not trying to find out what it cost the French to build the canal or any part of it, or the railroad or any part of it, but we are trying to find out what it is worth to us.

Admiral WALKER. Yes; exactly.

The CHAIRMAN. Well, why should it be worth \$300,000 to us to divert that railroad?

Admiral WALKER. Because it was necessary to divert it, and it has been diverted, and the cost of diverting it is estimated at \$300,000. The reason for that, Senator, is that the great Culebra cut comes through like that, we will say [indicating]. Now, the railroad comes along down here on the right-hand side and goes around this hill, and then, crossing this cut right here [indicating], goes on here.

It had to be gotten out of the way, so they have brought the railroad down here [indicating] and carried it off, still on the right-hand side of the canal, away down to the westward, to cross lower down. It was in the way of the canal and had to be taken out of the way.

The CHAIRMAN. When that canal is completed, your plan is to return the railroad to that berme or bench?

Admiral WALKER. Probably, yes. That has been suggested; the railroad would probably be run through the cut.

The CHAIRMAN. So that we would pay for having diverted it \$300,000, and then we would have to put it back at our own expense.

Admiral WALKER. Any changes or improvements we make after we own it, of course, we would have to pay for; but it is necessary to divert it here now and it has been diverted. The work has already been done.

The CHAIRMAN. Now, including that and these other diversions, the whole sum of value to us of this canal, as you estimate it, is \$22,895,028.

Admiral WALKER. Plus the contingents.

The CHAIRMAN. Now, I want to get at the "plus the contingents." Why, after appraising the property at its actual present value, do this Commission put on that \$4,579,005 for contingents?

Admiral WALKER. Because in making an estimate on a great piece

of work it is not an exact statement of the cost, but it is an estimate. That is, it is an opinion, and it is customary among engineers, in estimating on all engineering work, to add to their estimates a percentage for unforeseen things—forgotten things, all kinds of things—that may turn up in the future.

Senator MITCHELL. Is there not a great difference, though, Admiral, between estimating on a great work to be done and estimating the value of a work already done?

Admiral WALKER. If we could get at the exact figures of all the work that had already been done, of course we should not have to estimate on it at all. We could give the exact figures.

Senator MITCHELL. But is not that the fact here? Here is a certain plant which you find there, which it is suggested that the United States buy.

Admiral WALKER. We made no estimate whatever on the plant. This is the work done.

Senator MITCHELL. I mean the property, the work that has been done there.

Admiral WALKER. Remember that the work which they have done has been done on a plan different from ours, and we are obliged to estimate its value under our plan.

The CHAIRMAN. I understand that the Commission were trying to arrive at the present value of the work already done.

Admiral WALKER. Yes; the value to the United States of the work already done; that is, its value on the plan recommended by the Isthmian Canal Commission.

The CHAIRMAN. Very good; that is what I understand. Now, that being so, and you having already estimated that that work is worth, including the railroad diversion, the Chagres diversion, and the Gatun diversion—is worth \$22,895,028, how do you increase it above that by adding something for contingencies?

Admiral WALKER. We put on the same contingencies that we put on everywhere in our estimates all through, for errors of human judgment.

The CHAIRMAN. But that, as Senator Mitchell suggests, is for work that is to be done, and this is work that is already done.

Admiral WALKER. We put it on for the work that is done, because we are trying to value this work upon our plan, trying to get its value for our plan.

The CHAIRMAN. Now, I notice here, Admiral, in estimating these contingencies you put on 20 per cent, amounting to \$4,579,005, and make a total aggregate of \$27,474,033. I notice that on page 101. And then you put in that entire sum on page 103—\$27,474,033?

Admiral WALKER. Yes.

The CHAIRMAN. And you put the contingencies on again at 10 per cent, so that there is a double contingency on the same work.

Admiral WALKER. You will find the reason for that in the supplemental report, Senator.

The CHAIRMAN. I should like to have you state the reason, whatever you think it is; but that is evidently a doubling of the contingencies. You make it first on the \$27,000,000, and then make it again on the \$6,850,000 added.

Admiral WALKER. In this supplemental report it states, referring to the 10 per cent:

The last item being intended to cover any buildings, machinery, railroad shares additional excavation to date of purchase, and other assets which may be of value to the United States that have not been included in the other items.

Now, one of these items, you notice, is additional excavation to the date of purchase. We calculated on the excavation back a year and a half or two years. Suppose we purchase this; there will certainly be two years' additional excavation, which is included in that 10 per cent; and that two years' work would be valued. I should estimate that it would be worth about \$2,000,000.

The CHAIRMAN. If the last estimate, on page 103, of 10 per cent on \$36,824,033 covers buildings and machinery and the like of that, what does the first estimate of the 20 per cent, amounting to \$4,579,005, cover?

Admiral WALKER. That covered errors of judgment and unexpected things of all kinds.

The CHAIRMAN. Errors in whose judgment?

Admiral WALKER. Our own judgment.

Senator HARRIS. Is it not possible, Admiral, that the contingency would be just as great that this work would not be quite as advantageous to the Government as that it would be more advantageous to the Government?

Admiral WALKER. My experience is that it is not. My experience is that one would be much more likely to underestimate than to overestimate on a great work.

Senator HARRIS. That is, as to the original cost; but here we are estimating as to its value to the Government.

Admiral WALKER. Referring to these questions of contingencies, I will say now: I do not know whether the members of the committee know or not that the French offered us their property for \$40,000,000, according to the estimate of the Commission made in this report.

Senator HARRIS. When was that offer made?

Admiral WALKER. It was made on the 9th of January.

Senator HARRIS. Was any definite offer ever made before that?

Admiral WALKER. No. In addition to what we estimated for specifically they turn over to us under this \$40,000,000 their hospitals on the Isthmus, which they value at a little less than a million dollars. I can not tell you the exact amount; I should have to look that up; and they turn over to us what they call their private estate. The value of the two they estimated to be \$2,600,000. They also turn over to us all their plant on the Isthmus, which they say has cost them, first and last, a very large sum, and which will probably be of considerable value in constructing the canal, although not estimated for by the Commission. Nobody can tell its value until it is put into use. It would be necessary to have their hospitals, of course, and from their plant, the hospitals, and what they call their private estate, we would undoubtedly get property worth five or six million dollars, covering our contingent estimate.

Senator KITTREDGE. What is meant by the word "plant" in this connection?

Admiral WALKER. "Plant" means machinery, locomotives, cars, railroad tracks—all the implements for carrying on their work.

Senator KITTREDGE. Independent of the Panama Railroad Company?

Admiral WALKER. Yes; independent of the Panama Railroad Company.

Senator HARRIS. Any of this plant belong to contractors?

Admiral WALKER. No.

Senator HARRIS. It all belongs to the company?

Admiral WALKER. Yes; they have an enormous plant there, but no man can now tell what its value is.

Senator HARRIS. We all understand there has been an enormous waste of money in the accumulation of useless machinery.

Admiral WALKER. The accumulation, not of useless machinery, but the accumulation of a large surplus of machinery.

Senator HARRIS. I have always understood there was a vast expenditure in the purchase of machinery which, on arrival on the ground, proved to be unfitted and unsuited for use.

Admiral WALKER. I can not say that. I rather doubt that; but, for instance, they have a large number of locomotives down there that have never been used. They are perfectly good.

They would have, of course, to be overhauled and examined before being put into use; but they are perfectly good; have never been used. They are in buildings, carefully protected by the new company. They have also a great number of excavators and many dredges in good order, but they are of a somewhat obsolete pattern.

Senator HARRIS. I supposed they were out of date.

Admiral WALKER. We have made no estimate of their value and they are not in our \$40,000,000, except as a contingent; but they are now in the offer to sell by the French company.

The CHAIRMAN. Admiral, the contingencies on page 103 of the report of the Isthmian Canal Commission, according to my calculation, amount to \$7,264,806. Is that correct?

Admiral WALKER. The contingencies put in on that page amount to something less than \$4,000,000.

The CHAIRMAN. On that page?

Admiral WALKER. Yes.

The CHAIRMAN. I add them on both pages. What is the whole amount of contingencies that you have allowed to the French Panama Canal Company in this \$40,000,000? What is the whole amount of contingencies?

Admiral WALKER. On page 101 we have allowed \$4,500,000, roughly speaking.

The CHAIRMAN. \$4,579,005.

Admiral WALKER. Yes.

The CHAIRMAN. And on page 103?

Admiral WALKER. On page 103 we have added 10 per cent, which is about \$3,500,000. We do not make it exact. We add 10 per cent, and call the total \$40,000,000. It would be somewhat less than \$4,000,000; about \$3,700,000.

The CHAIRMAN. What is the aggregate of that sum allowed by you for contingencies?

Admiral WALKER. It would be about \$8,000,000.

Senator HARRIS. \$8,200,000, is it not?

Admiral WALKER. Yes, a little over \$8,000,000.

The CHAIRMAN. How much of that contingent fund or allowance represents actual property?

Admiral WALKER. The contingent is added to the estimate to try to make the estimate a just one—to try to cover omissions, of which there must always be a great number as long as men are fallible. You can not get in every little thing, and it is the usual course pursued by engineers. This whole calculation was made by the engineers of our Commission; they went over it very carefully, discussed it and talked it over, and finally agreed upon this matter. It was then adopted by the Commission.

The CHAIRMAN. Not being an engineer, I am trying to understand it. I do not know what it means, and I want to know.

Admiral WALKER. Well, perhaps you had better ask the engineers themselves. They can, perhaps, make it clearer to you than I can.

The CHAIRMAN. No, I go to the head of the Commission which made these reports to find out what has been done, of course. Now, the omissions you speak of are not the omissions of the French people, but the omissions of this Commission.

Admiral WALKER. They are errors and omissions in making up an estimate of the probable value of their work for our plan of the canal.

Senator MITCHELL. If it should turn out that your estimate was too high, then we would lose just that much money?

Admiral WALKER. That depends upon whether you think \$40,000,000 is a high offer or a low one. I think it is a low offer, myself.

Senator HARRIS. In speaking of the custom of engineers, is it not a fact that the custom of engineers is to add to the percentage for contingencies in estimating the cost of a piece of work——

Senator MITCHELL. Work to be done?

Senator HARRIS (continuing). And to deduct a percentage for contingencies in estimating the value of a piece of work that has been done, or that is to be purchased?

Admiral WALKER. Engineers always add a contingent percentage in estimating work to be done, and in getting at this work we took just the same course.

Senator HARRIS. In estimating the value of a piece of work for a given purpose, in order to be on the safe side, we generally deduct a percentage for contingencies, if it is a piece of work that has already been done.

Admiral WALKER. Yes; but in this case we had to estimate precisely as if we were going to construct it, and we estimated in precisely the same way.

Senator HARRIS. Not precisely as if you were going to construct it, because that was work already done, and your estimate was only as to its value as relating to future work, and in that case you should deduct the percentage.

Admiral WALKER. It was not the work that was done; it was that portion of the work done that would be effective on our plan.

Senator HARRIS. Exactly, and there is where the element of doubt comes in as to whether your rule is applicable in the prosecution of the future work, as your estimate shows.

Admiral WALKER. Well, I suppose we are all liable to make mistakes.

Senator HARRIS. These contingencies are to cover that fact?

Admiral WALKER. We had some engineers on the Commission as able as there are in the United States.

Senator HARRIS. No one doubts that.

Admiral WALKER. And they have gone over this with great care, so I do not stand on my own judgment about it; but I am perfectly willing to stand on the judgment of the skilled engineers that we have.

The CHAIRMAN. As to the \$2,000,000 for maps, and 10 per cent on that, \$200,000, did you make any allowances for omissions in regard to the value of those things?

Admiral WALKER. It is difficult, in fact impossible, to tell what is the value of the maps and data that they have, which includes maps, figures, records, and everything; all the engineers' data, all the data of every kind. They valued it themselves at \$3,500,000. Our engineers valued it at \$2,000,000, thinking that was a fair estimate.

The CHAIRMAN. Is that the cost of making the maps and the surveying that they represent?

Admiral WALKER. Yes.

The CHAIRMAN. So that in buying these we pay for the surveying done by the old Panama company and the new.

Admiral WALKER. We pay \$2,000,000 for it. It may have cost ten times that amount.

The CHAIRMAN. Have they not frequently changed their work there from one plan to another?

Admiral WALKER. They have changed their plans, yes.

The CHAIRMAN. We pay for all those changes, too.

Admiral WALKER. No; we pay what we believe to be a low value for their property at present.

The CHAIRMAN. You got out of those papers the information upon which you acted in making your report?

Admiral WALKER. Yes; we got the information out of those papers, to a considerable extent.

The CHAIRMAN. You have it yet?

Admiral WALKER. Yes.

The CHAIRMAN. You think it reliable?

Admiral WALKER. Yes.

The CHAIRMAN. Why do we want to buy it from them at \$2,000,000?

Admiral WALKER. Ordinary fair dealing, I think, if we were buying their property from them, would be to give them some price for it. We have a great deal of information from them, but we have not one-tenth or one-fiftieth part of their data, and in going to work we should want to be able to go back to the data at any point that was necessary to clear up anything.

The CHAIRMAN. If you were put in charge of the construction of the Panama Canal after we have bought it, you would not undertake it, would you, without having a corps of engineers survey the whole business for yourself?

Admiral WALKER. I should put engineers at work there upon various details, as any constructing engineer would do.

The CHAIRMAN. Would you be satisfied to undertake that great work without having your engineers do the whole thing?

Admiral WALKER. It would not be necessary to do the whole work as if nothing had been done there, if that is what you mean.

The CHAIRMAN. I mean just to get your own plans, your own levels.

Admiral WALKER. I should do whatever work was necessary to determine any point that might come up; but the work that has been done is enormously in excess of anything that would have to be done in the future in the way of surveys and examinations.

The CHAIRMAN. Would you just adopt that French work wholesale, without any sort of checking by your own engineers?

Admiral WALKER. No; I have said repeatedly that our plan was a different one from the French plan, and we estimated the value of their work upon our plan.

The CHAIRMAN. Therefore, your plan being different from the French plan, you would have to make surveys upon which to base it.

Admiral WALKER. Not at all.

The CHAIRMAN. Would you take the French surveys to construct a different plan from the one they have adopted?

Admiral WALKER. The French surveys are entirely sufficient as they stand to-day; but a constructing engineer going there with a force would examine details, examine points, examine anything that he thought necessary to examine, but nothing more. He would not do all the work over again, of course.

The CHAIRMAN. I will leave this branch of the subject for the present and come back to it after a while.

Admiral WALKER. While I think of it, Senator Harris, you spoke yesterday of the cost of maintaining the harbors. I thought it was in the report but did not recollect the figures then. It is \$30,000 a year for Colon, \$100,000 a year for Greytown, and \$50,000 a year for Brito, according to our report.

Senator HARRIS. For maintenance?

Admiral WALKER. Yes.

Senator HARRIS. There is no estimate for Panama?

Admiral WALKER. No, sir; we say specifically that there is nothing needed there.

The CHAIRMAN. You have spoken of an offer to sell on the part of the French company—an offer to sell this canal for \$40,000,000. I believe you said it was made on the 9th of January.

Admiral WALKER. Made on the 9th of January, I think, for the sale of their entire property.

The CHAIRMAN. That is the first offer that was ever made. Is that in writing?

Admiral WALKER. It was by cable, and the cable was afterwards confirmed by letter.

The CHAIRMAN. Have you the letter?

Admiral WALKER. Yes, I have the letter, I think.

The CHAIRMAN. Can you produce it before the committee?

Admiral WALKER. I can, or a copy of it.

The CHAIRMAN. Well, we want that.

Admiral WALKER. The first cable was on the 9th of January, and I suggested that as it was worded it might be thought that it did not apply to their maps and archives in Paris, and you will see that on the 11th, two days later, they sent another cable, saying that it did apply to all their maps and archives in Paris.

The CHAIRMAN. It will be impossible for us to close the examination without examining that letter, because that is the evidence of title.

PARIS, January 9, 1902—4.07 p. m.

Admiral WALKER,

President Isthmian Canal Commission, Corcoran Building, Washington:

The New Panama Canal Company declares that it is ready to accept for the totality, without exception, of its property and rights on the Isthmus, the amount of \$40,000,000; the above offer to remain in force up to March 4, 1903.

BÔ, *President of the Board.*

Admiral WALKER. That was the one.

The CHAIRMAN. Was that the cable upon which the Commission acted?

Admiral WALKER. That was the first cable that was received; there were others later.

The CHAIRMAN. That is the property on the Isthmus?

Admiral WALKER. Yes. Two days later they sent a cable saying that the offer also included their maps and archives in Paris.

The CHAIRMAN. They say they are willing to accept for the totality, without exception, \$40,000,000. Does that mean that we were to offer them \$40,000,000?

Admiral WALKER. I can not speak for the president of the French board. It means to me that they will take \$40,000,000 for their property; that they offer it for \$40,000,000.

The CHAIRMAN. You have never offered \$40,000,000 for it?

Admiral WALKER. I have never offered \$40,000,000 for it.

The CHAIRMAN. Or any sum?

Admiral WALKER. No, sir; the Commission had estimated its value at \$40,000,000.

The CHAIRMAN. Then here is this other cable:

PARIS, January 11, 1902—4.17 p. m.

Admiral WALKER,

President Isthmian Canal Commission, Corcoran Building, Washington:

Offer of sale of all our property applies also to all maps and archives in Paris.

Bô, *President of the Board.*

Admiral WALKER. Yes, sir.

The CHAIRMAN. Is that as far as they went in making any offer?

Admiral WALKER. That is as far as they went in that cable.

The CHAIRMAN. All the property on the Isthmus and all the maps and archives in Paris.

Admiral WALKER. Yes.

The CHAIRMAN. Was that offer enlarged or defined any more particularly than that?

Admiral WALKER. No.

The CHAIRMAN. The Commission acted upon that?

Admiral WALKER. The Commission acted upon that. Or it is not proper, perhaps, to say that the Commission acted upon it, but that was what the Commission considered in making its report.

The CHAIRMAN. Did they have anything else before them?

Admiral WALKER. They had all the cables—this next cable that is printed here.

The CHAIRMAN. I will read that:

PARIS, January 14, 1902—9.45 p. m.

Admiral WALKER,

President Isthmian Canal Commission, Corcoran Building, Washington:

We send by mail letter confirming cable 11th January, and, under registered package, judgment August 2, agreement with liquidator, and three extracts showing powers of board. All these documents are certified to by the United States consulate-general.

Bô, *President of the Board.*

Admiral WALKER. That is correct.

The CHAIRMAN. Did you have those before you at the time you made your report?

Admiral WALKER. We had those cables before us.

The CHAIRMAN. You had the cables, but not the papers?

Admiral WALKER. Not the papers; they were coming by mail.

The CHAIRMAN. Have they arrived?

Admiral WALKER. Yes, they have arrived.

The CHAIRMAN. Will you produce them?

Admiral WALKER. I will give you copies of them, if you wish.

The CHAIRMAN. We would like to look at them and see them. Are they in French or English?

Admiral WALKER. They were in French, but I have had them all translated.

The CHAIRMAN. By whom?

Admiral WALKER. By different people; Mr. Lampre and Mr. Bœufvé translated them, and then we went over them ourselves. I went over them carefully and I had them gone over by one or two people.

Senator MITCHELL. The Panama Canal Company of France do not pretend or claim to own the Panama Railroad at all, but simply that they control a majority of the stock.

Admiral WALKER. Out of 70,000 shares of stock they own a little less than 69,000.

Senator MITCHELL. But that railroad company is controlled by the company organized under a charter in New York.

Admiral WALKER. Yes.

Senator MITCHELL. Which sits in New York.

Admiral WALKER. It is an American corporation.

Senator MITCHELL. So that the property of the railroad is not owned by the Panama Canal Company, but by the Panama Railroad Company?

Admiral WALKER. The Panama Railroad Company owns its own property, of course. It is an independent corporation, the canal company owning sixty-nine-seventieths of its stock.

The CHAIRMAN. What evidence is there of the right of the company to sell the property to the United States?

Admiral WALKER. Well, the fact that they own the property.

The CHAIRMAN. Is that all?

Admiral WALKER. That is enough, I think. I do not know why they should not have the right to sell their own property.

The CHAIRMAN. Were any writings or papers brought before you to show their right?

Admiral WALKER. We have the agreement and—well, perhaps I had better tell you my understanding of it, Senator. The old company was organized to build the canal, and it failed.

The CHAIRMAN. Now, Admiral, I do not want your understanding unless you have the papers to show that it is correct.

Admiral WALKER. I can give you all the papers we have.

The CHAIRMAN. We want to see those.

Admiral WALKER. Then you can determine for yourself whether my understanding is correct.

The CHAIRMAN. This committee are obliged to act upon the title papers to form their own judgment.

Admiral WALKER. Certainly. You can take my statement for whatever you consider it worth.

The CHAIRMAN. You can make your statement, but we reserve the right to form our own judgment, after an examination of the papers.

Admiral WALKER. Certainly, you can call my statement worthless, if you like; I have no interest in that. I only give you my own statement. The old company was organized to build the canal, and after a time it failed.

The CHAIRMAN. Just wait one moment, if you please. You say it failed. In what way did it fail?

Admiral WALKER. Well, it came to an end; it could not carry on the work. It failed as any corporation may fail.

The CHAIRMAN. Failed for the want of money to carry on the work?

Admiral WALKER. Failed for want of money to carry on the work, I presume. It went into the hands of a receiver.

The CHAIRMAN. Who carried it into the hands of a receiver?

Admiral WALKER. The courts put it into the hands of a receiver.

The CHAIRMAN. Well, a court can not do that on its own motion. It requires some person to move before the court can act.

Admiral WALKER. I do not care anything about the technicalities of the thing—

The CHAIRMAN. I do.

Admiral WALKER. I am trying to give you the facts as I understand them.

The CHAIRMAN. I do care about the technicalities—

Admiral WALKER. And if you will allow me to make my statement in my own way, I will do so. I will not discuss technicalities of French law.

The CHAIRMAN. I am not trying to discuss technicalities of law. I am trying to find out how much you know about it—not your opinion but your knowledge.

Admiral WALKER. I suppose you will not dispute the fact that the old company went into the hands of a receiver, will you?

The CHAIRMAN. You can go on and make your statement.

Admiral WALKER. It went into the hands of a receiver, and the receiver, acting for all the parties in interest, made a contract, under the authority of the court, with the new company which had been organized, turning into the new company the property of the old, under the terms of the contract. Now, the new company comes to a point where it can not go on with the canal, certainly in the face of the fact that the United States is threatening to build one, and it proposes to sell out to the United States. The receiver of the old company joins in that proposal to sell, under the authority of the court which has already been given, and under the contract with the new company as to the disposition of the funds.

Senator MITCHELL. What was the consideration passing to the old company?

Admiral WALKER. They turned in their property to the new company, and their contract was that the receiver should receive 60 per cent of the net profits——

Senator HARRIS. Turned over their property to the new company, you mean?

Admiral WALKER. Yes.

Senator MITCHELL. That is, on the theory that the new company would go ahead and construct the canal.

Admiral WALKER. Yes; that is what it was organized for originally. Now, a sale by the new company, in which the receiver of the old company joins, under the authority of the court, would seem to me to make the title good.

The CHAIRMAN. Has the Isthmian Canal Commission had before it, or has it now in its possession, the documents to show all of these facts that you state about the proceedings in court?

Admiral WALKER. I think we have everything, either in print or in manuscript or typewritten form.

The CHAIRMAN. When did you receive those documents?

Admiral WALKER. We have had some of them for a year or two. We have had others within a short time.

The CHAIRMAN. How short a time?

Admiral WALKER. Well, we have received some papers by mail within a few days. I think those M. Bô refers to here as having been sent were received about the 21st or 22d, perhaps, of January. This states that they were sent on the 14th, and it takes a week or ten days to get them here. I can not tell just what time they arrived. They have a receiving stamp on them which will show in the office.

The CHAIRMAN. It is impossible for any committee, I think, to receive a statement as being reliable in regard to legal proceedings and statutes unless they are produced. Will you produce those papers before the committee?

Admiral WALKER. I will give you copies of those that we have lately received. Those that are in print I suppose you have yourselves. If not, you can get them.

The CHAIRMAN. This is all you know about the title to that property and the right of the company to sell?

Admiral WALKER. That covers it in a general way.

The CHAIRMAN. You have spoken about stock in the Panama Railroad Company belonging to the Panama Canal Company. Where is that stock?

Admiral WALKER. It is held for the Panama Company. I do not know where it is. I do not know where the certificates are actually located—whether they are in New York, or where they are.

The CHAIRMAN. You say they are held for the canal company?

Admiral WALKER. Yes.

The CHAIRMAN. You do not know whether they are in New York or in Paris or on the Isthmus?

Admiral WALKER. No; I do not know. They are probably not on the Isthmus. They are either in New York or Paris, I should say.

The CHAIRMAN. You do not know where they are?

Admiral WALKER. No, sir.

The CHAIRMAN. Do you know anything of the company that holds this stock in its possession?

Admiral WALKER. The Panama Canal Company—I know something of it.

The CHAIRMAN. No; I mean the depository.

Admiral WALKER. I do not know where it is deposited.

The CHAIRMAN. Do you know whether the depository has any lien upon it?

Admiral WALKER. I do not know anything about it.

The CHAIRMAN. Never have ascertained?

Admiral WALKER. No.

Senator MITCHELL. Do you know anything about the power of the company, organized in France—the Panama Canal Company—to hold stock in an American corporation?

Admiral WALKER. No; I do not know.

Senator MITCHELL. You do not know anything about that?

Admiral WALKER. I think there is no question that they have that power.

The CHAIRMAN. Why do you think so?

Admiral WALKER. I think so, as I should think that a corporation in France would have the right to acquire property in any direction that it chose just as a corporation would in the United States.

The CHAIRMAN. That is your idea about it?

Admiral WALKER. Yes, sir.

Senator KITTREDGE. What member of your Commission has had the legal features specially in charge?

Admiral WALKER. Ex-Senator Pasco has had more to do with that than anybody.

The CHAIRMAN. You have really relied upon his judgment, have you not?

Admiral WALKER. To some extent we have.

The CHAIRMAN. Have you followed his advice in these matters?

Admiral WALKER. I do not know what advice you refer to.

The CHAIRMAN. I mean his advice as to the validity of this title.

Admiral WALKER. We have not gone into the question of the validity of the title. That is none of our business. That will be worked up by the legal executive department of the Government. Of course, if the Government buys the Panama Canal Company's property, it will not receive the property nor pay the money for it until the title has been searched and passed upon by the proper authorities. We did not take that up. It is not one of the things for us to do.

The CHAIRMAN. You say it is none of your business. If that is so, why did you make any investigation about it?

Admiral WALKER. Because we wanted information, in order to act as intelligently as possible on this entire business; but I do not think anything we could do would relieve the Administration from the necessity of having the title searched and being assured that it was a good title.

The CHAIRMAN. Well, is not the right to sell an essential part of the decision made by the Commission that the Panama route is feasible and practicable?

Admiral WALKER. We state that it is feasible and practicable. It can be feasible and practicable whether they have a right to sell or not; but we assume that they have a right to sell.

The CHAIRMAN. What definition do you give to the term "feasible," then, in this connection?

Admiral WALKER. When we were dealing with the feasibility and practicability of the routes, we understood that we were to take into consideration everything that bore on the route which was the best for the United States.

The CHAIRMAN. That would necessarily include the title to it, would it not?

Admiral WALKER. That would necessarily include, in the case of the Panama route, the possession of the property, the ownership of the property, the ownership of the necessary concessions, and a consideration of the engineering questions that came up. In fact, it would include everything bearing on that route.

The CHAIRMAN. Do you understand the two words that define your duty—to ascertain whether it is "practicable" and also whether it is "feasible"—do you understand those two words to mean the same thing?

Admiral WALKER. Perhaps not exactly the same thing.

The CHAIRMAN. What does "feasible" include then, if it does not include the question of the title?

Admiral WALKER. Well, you can take your own opinion.

The CHAIRMAN. No; I am trying to get yours.

Admiral WALKER. You can take your own judgment. My understanding is that to say a route is practicable or feasible means that it can be built, that the engineering difficulties are not so great but that it can be built.

Senator HARRIS. You mean physically.

The CHAIRMAN. Is that all you mean?

Admiral WALKER. Then we mean that we can get a proper title to it, that we can obtain the proper concessions from the country through which it passes; that, everything considered, that route is practicable and feasible.

Senator MITCHELL. By "practicable" you mean what Napoleon meant when at the foot of the Alps he said to his guide, "Is the route practicable?" And his guide replied, "It is barely possible." Napoleon then said, "Let us proceed."

The CHAIRMAN. Well, is it necessary for you to determine, under the authority of these words "feasible" and "practicable," that there is a title there which the Panama Canal Company can convey—

Admiral WALKER. It is unnecessary for us to determine it. It is necessary for us to arrive at a reasonable judgment about it. We see nothing in the way of the Panama Canal Company giving title, and we act upon that supposition. We see no reason to doubt that we can acquire from Colombia the concessions that we need, and at a reasonable price. Now, we may be mistaken in that, because we do not make the treaty. The treaty is not made, but we see no reason to doubt that, and we do not put any price upon the concessions by either route.

We assume in a general way that the price of the concessions will be about the same either way, either by Nicaragua or Panama. We have no means of telling, of course——

The CHAIRMAN. I do not mean that you shall determine for us, or for Congress, or for the President, either the feasibility or the practicability of this route; but you are to determine it for yourselves as a commission as the basis of your recommendation. Now, in ascertaining that basis of representation, did you examine all of those questions of law that arise on the proceedings of the courts and under the laws of France?

Admiral WALKER. We did not determine questions of law at all, Senator. We examine the question and arrive at what we believe to be a reasonable and proper conclusion. We do not determine the question of title. We leave that to the people, who, under the law, must determine it; must settle it. We do not settle it at all. But if we saw anything that we believed would make it impossible to get the title, that would be a part of the subject before us, and might have affected our report to any extent; but as a commission we saw nothing in the way of acquiring, no reasonable doubt in the way of acquiring title, and no reasonable doubt in the way of acquiring the necessary concessions.

The CHAIRMAN. In arriving at your conclusion, did you examine the records of the courts and the laws of France?

Admiral WALKER. No, sir; we did not search records.

The CHAIRMAN. That is what I want to get at.

Admiral WALKER. We did not go to Paris to look up or examine the records of courts.

The CHAIRMAN. You went to Paris, though?

Admiral WALKER. Yes; we went there more than two years ago, to examine the data of the canal company, and confined ourselves to that.

The CHAIRMAN. At that time you had this question under discussion of acquiring the rights of the Panama Canal Company?

Admiral WALKER. We raised the question while we were there, but we were not there to search the title, and we would not have been competent to do so if we had attempted it.

The CHAIRMAN. Why did you raise the question if you were not competent to determine it?

Admiral WALKER. Because we were directed under the law to get all possible information upon that subject for the President.

The CHAIRMAN. And you commenced it in Paris?

Admiral WALKER. We commenced it in Paris.

The CHAIRMAN. And did not conclude it, as I understand you?

Admiral WALKER. We commenced it in Paris, and we could get no definite reply to our questions. So the thing dragged on until we finally made our report, without really a definite reply, and with only an indefinite statement from them, as to what they valued their property at.

The CHAIRMAN. Have you ever got a definite reply from the Panama Canal Company as to the grounds upon which it rests its title to this property and its right to sell it?

Admiral WALKER. No; we have not asked them upon what grounds they rested it.

The CHAIRMAN. Did you have Mr. Lampre before you as a commission?

Admiral WALKER. No, sir.

The CHAIRMAN. Did he not appear there?

Admiral WALKER. No, sir. He has been in the office a good many times, but we have not had him before us.

The CHAIRMAN. Have you not conferred with him about the law of the case at all?

Admiral WALKER. I have asked him various questions and he has told me various things about the French laws, but that was for my own information.

The CHAIRMAN. Of course if it was for your own information, do you predicate your judgment in any sense upon his statements?

Admiral WALKER. I dare say to a greater or less extent.

The CHAIRMAN. To a greater or less extent, so that in following up a question of law that you seem not to have investigated for yourself particularly you took the advice of Mr. Lampre and also of Mr. Pasco?

Admiral WALKER. I have already said I did not take the advice of Mr. Lampre.

The CHAIRMAN. You got information from him?

Admiral WALKER. I have asked him various questions in the pursuit of information I wanted, as I would ask you or any gentleman with whom I was talking.

The CHAIRMAN. I do not mean that he brought your mind to a judgment, but that you got information from him as to the state of the law in France.

Admiral WALKER. I have talked with him about it more or less.

The CHAIRMAN. And also from Mr. Pasco?

Admiral WALKER. Yes; I have talked these matters over with Mr. Pasco a good deal, first and last.

The CHAIRMAN. So that your judgment that the Panama Canal Company has a perfect right to make this conveyance is based upon what Mr. Lampre told you and what Mr. Pasco told you.

Admiral WALKER. It might be said to be based somewhat upon what they have told me, and then I have read more or less about it. I have looked into the thing somewhat. I do not pretend to be a lawyer or to look up questions of law.

The CHAIRMAN. Mr. Lampre has been sworn as a witness before this committee, and he was asked the question, on page 7:

The CHAIRMAN. Does that charter expressly authorize this company to sell its concessions?

M. LAMPRE. No; it does not.

The CHAIRMAN. While that charter stays in force, can this company sell its concessions without an act of the French Congress?

M. LAMPRE. Quite so. Under the general laws of France the stockholders' meeting is the only authority to investigate into the action of private corporations and to give them authority.

The CHAIRMAN. Then a stockholders' meeting can acquire by their act authority to dispose of their property to anybody without the consent of the Government?

M. LAMPRE. That is quite the fact. The Government has nothing whatever to do with private corporations.

The CHAIRMAN. It is a surprising statement to me, at all events, as an American lawyer, that any corporation can exceed the bounds of its authority and can dispose of its entire property to any person anywhere, at any time, and for any consideration without the authority or assistance of any act of the legislature or the consent of the Government.

M. LAMPRE. Nothing whatever of the kind is required. Corporations are quite free in France and independent of the Government. It has been so from the year 1867.

Did he make a similar statement to you of the law of France?

Admiral WALKER. I have read that testimony, but I do not know that he has ever made a statement of that kind to me.

The CHAIRMAN. You do not remember?

Admiral WALKER. No, sir.

The CHAIRMAN. Has he made any statements to you to the contrary of that?

Admiral WALKER. I do not know that he has. I can not say what he may have said or may not have said in a dozen conversations or

more that I have had with him. I do not know that it is material in any way.

The CHAIRMAN. I read further, from page 22 of the printed hearing of Mr. Lampre:

The CHAIRMAN. Then, if I gather your idea correctly, the Colombian Government, because it is a stockholder in the Panama Canal Company, has given up her sovereign powers and has no other powers than those of any other stockholder?

M. LAMPRE. Its powers as a stockholder and the power derived from the concession.

The CHAIRMAN. And she is subject to the courts of France, to be disposed of as to her interests in this stock as if she were a citizen of France.

M. LAMPRE. I must insist on this point. We are not subject to the courts of France; and, moreover, the only authority that we have to apply to is the stockholders' meeting. The Colombian Government, being a stockholder, and having a representative at the stockholders' meeting, has passed upon the resolution giving power to the company to negotiate a sale to the United States.

The CHAIRMAN. Now, you state that as being the action of the Colombian Government?

M. LAMPRE. I do.

Did he make a statement of that kind to you?

Admiral WALKER. I do not know whether he did or not.

The CHAIRMAN. In his various conversations with you about this matter?

Admiral WALKER. He has made no formal statements to me that I know of. As I said, we have talked about these matters at various times.

The CHAIRMAN. On page 19 of the same hearing he was asked these questions, and made these answers:

Senator MITCHELL. May I ask a question just at that point? Suppose the United States accept your offer and pay you \$40,000,000, and then suppose there should be some failure of the arbitration proceeding which would result in the liquidator or those he represented not getting any portion of the \$40,000,000. The United States having obtained the benefit of your property, would not these stockholders have an equitable claim against the United States, through the liquidator?

M. LAMPRE. No, sir; in no way whatever, because according to the terms of the agreement passed between us and the liquidator, and according, moreover, to the legal conditions in France of an arbitration, we, I mean the contracting parties, on the one side the liquidator and on the other side the new company, agree, positively agree, to accept as absolutely binding the decision of the arbitration.

Senator MITCHELL. The United States would have to run the risk of them carrying out that agreement with the liquidator?

M. LAMPRE. No; they would have to run no risk whatever, according to my opinion.

Did he make any statement of that sort about the liability of the United States Government to the stockholders?

Admiral WALKER. No, sir, not to me; but I would like to ask a question, Senator, if you will permit me: After the property is sold to the United States, and the money paid, would not the rights of the old stockholders, whatever they are, pass from the property to that money. that \$40,000,000 that was paid, that would be in the hands of the French courts?

The CHAIRMAN. I do not think so, Admiral. Now let me ask you this question: Is that the ground upon which you based the idea—

Admiral WALKER. No; that was only a question I asked for information.

The CHAIRMAN. Wait a moment. You are the witness now, and I want to put my question. Is that the proposition upon which you based the idea that the United States would have no liability to those stockholders?

Admiral WALKER. No; I have made no proposition. I only asked that for information.

The CHAIRMAN. Well, is that the ground upon which you make this

statement, or upon which you reach this conclusion, that the United States would have no liability to those stockholders in the event of buying the property?

Admiral WALKER. I do not believe they would have a particle of liability.

The CHAIRMAN. That is not an answer to my question. Is that the ground upon which you rest your opinion?

Admiral WALKER. I do not say what ground I rest my opinion on. I have no legal opinion about it, but my belief is that when the property is sold, and the title passed and the money paid, that the stockholders would have no claim whatever upon the United States. For instance, the International Steamship Company bought the Inman line of steamships some years ago. They bought the line and paid for it, and there has never been any trouble about it that I know of, and I do not think anybody in England has any claim on the United States about it, or on the International line. Mr. J. P. Morgan is said to have bought large steamship lines. They were English lines bought by citizens of the United States. I do not know that there was anything irregular about it. I do not see that there would be anything irregular about the United States buying out the Panama Canal property, although, as I say, I am no lawyer and do not pretend to discuss legal points. It seems to me a simple business transaction.

The CHAIRMAN. Let me know when you get through with your answer. Are you through now?

Admiral WALKER. Yes, I am through for a moment.

The CHAIRMAN. There are stockholders and bondholders of the Panama Canal Company in the United States now asking Senators as to what their rights are against this canal company and also against the United States. In your investigation of this subject did you take into consideration the rights of these American stockholders, and the power of a court of France to cut them off absolutely from any participation in this fund by transferring the debts and obligations to the sum realized by the sale of this property to the United States for \$40,000,000? Did you investigate that subject?

Admiral WALKER. I did not. I told you that I made no legal investigation at all, but my opinion was that if the property was sold under the authority of the courts of France the title that was conveyed would be a good title, and that any claims that the people had then would have to take their chances with that fund.

The CHAIRMAN. That \$40,000,000.

Admiral WALKER. That \$40,000,000 which had been paid for the property, exactly as if a piece of property had been sold out under the foreclosure of a mortgage here in the United States.

The CHAIRMAN. That is a very interesting question. Now, I will ask you, When is this \$40,000,000 to be paid under the contract with the Panama Canal Company?

Admiral WALKER. We have made no contract.

The CHAIRMAN. Your proposition.

Admiral WALKER. We have made no proposition.

The CHAIRMAN. The proposition you have accepted.

Admiral WALKER. We have not accepted a proposition.

The CHAIRMAN. You have advised the President to accept one.

Admiral WALKER. We have not advised the President to accept any. We have simply reported that under this offer we consider Panama the most feasible route.

The CHAIRMAN. You have named in your report a proposition of \$40,000,000.

Admiral WALKER. Yes.

The CHAIRMAN. Is that the proposition you now refer to?

Admiral WALKER. A proposition to sell all their rights and property for \$40,000,000, which, I understand, is the thing being discussed here.

The CHAIRMAN. When is that \$40,000,000 to be paid?

Admiral WALKER. That I know nothing about. I presume it will be paid after a clear title has passed to the property and the property is received.

The CHAIRMAN. Are there any considerations or terms to be made at all?

Admiral WALKER. No contract has been made. No authority has been given to make a contract.

The CHAIRMAN. So that you do not know what is to become of the \$40,000,000?

Admiral WALKER. I do not know that \$40,000,000 will have to be paid; but if it is paid——

The CHAIRMAN. Suppose \$40,000,000 is paid under this proposed agreement; what is to become of it, who is to receive it?

Admiral WALKER. Naturally it will be paid over to the parties legally authorized to receive it, whoever they may be.

The CHAIRMAN. Who are they?

Admiral WALKER. I do not know that. That is a matter between the companies and the French courts.

The CHAIRMAN. Would it not be paid to the owner of the property?

Admiral WALKER. I do not know that it would. It would be paid to the representatives of the property, undoubtedly.

The CHAIRMAN. Have you gone no deeper into it than that, to ascertain where this money is to go?

Admiral WALKER. It is none of my business where it goes.

The CHAIRMAN. None of your business?

Admiral WALKER. No, sir.

The CHAIRMAN. None of your business as the president of this Commission?

Admiral WALKER. The president of this Commission was not placed here to pay over \$40,000,000.

The CHAIRMAN. Who would get the \$2,000,000 for the maps?

Admiral WALKER. The payment of the \$2,000,000 would be made in the lump sum paid for the entire property.

The CHAIRMAN. Who would get it?

Admiral WALKER. The owners of the property, I suppose, through their proper representatives.

The CHAIRMAN. The owners of what—of the canal?

Admiral WALKER. Undoubtedly the new Panama Canal Company would have its interest in it.

The CHAIRMAN. Would the liquidator get any part of that?

Admiral WALKER. Under the contract that has been made the liquidator would get his share whatever that was determined to be.

The CHAIRMAN. Determined by whom?

Admiral WALKER. By the arbitrators.

The CHAIRMAN. What arbitrators?

Admiral WALKER. Under the contract between the liquidator and the new Panama Canal Company it is provided that the \$40,000,000 received shall be paid to the liquidator, for the parties whom he represents, and to the new canal company, according to the terms of an arbitration, and the arbitrators have already been appointed, two for the company, two for the liquidator, and the fifth, who is the umpire in case they do not agree.

The CHAIRMAN. Is that proceeding in writing?

Admiral WALKER. We have it here.

The CHAIRMAN. You have copies of it in writing?

Admiral WALKER. Yes.

The CHAIRMAN. Will you produce them to the committee?

Admiral WALKER. Yes; I shall send them with the other papers.

The CHAIRMAN. Your recommendation that that is the most feasible route includes the proposition that this money, when it shall be received will be distributed by arbitration in France?

Admiral WALKER. We have nothing to do with that; we have nothing to do with the payment of the money or with the direction the money takes after it is paid.

The CHAIRMAN. If you have nothing to do with it, how did you happen to find it out?

Admiral WALKER. Because I endeavored to inform myself upon all the phases of the canal question.

The CHAIRMAN. Now, Admiral, I ask these questions because you are the president of this Commission and must know every phase of this case before you can make a report, you must know it in some way to your own satisfaction, and I want to know the grounds upon which you acted and nothing else. That is all I want to find out, and that is the reason that I have gone into it as far as I have.

Senator MITCHELL. May I ask a question right there?

The CHAIRMAN. Certainly.

Senator MITCHELL. You state, as I understand you, that an agreement was made been the liquidator, acting under the direction of the court, and the new company?

Admiral WALKER. Yes.

Senator MITCHELL. By which the new company was authorized to make a sale of this property?

Admiral WALKER. Yes.

Senator MITCHELL. Was it stipulated in that agreement as to what amount it should sell for?

Admiral WALKER. My impression is it was not.

Senator MITCHELL. There was no sum mentioned?

Admiral WALKER. I think not. While I am not positive about that, I think that it was not named. The liquidator made that agreement under the authority of the court.

Senator HARRIS. You had copies of those papers?

Admiral WALKER. Yes.

Senator HARRIS. And those are part of the papers you promise to produce here?

Admiral WALKER. Yes.

Senator HARRIS. And they will show for themselves?

Admiral WALKER. Yes.

The CHAIRMAN. In looking into the question of the Panama Railroad, did you ascertain where the stockholders resided, besides the Panama Canal Company?

Admiral WALKER. I have seen a list of them, and the stock seems to be held some abroad and some in the United States.

The CHAIRMAN. Who has that list?

Admiral WALKER. I saw that list in the office of the company in New York, I think.

The CHAIRMAN. Have you a list of them?

Admiral WALKER. I am not sure whether I have or not.

The CHAIRMAN. If you have, will you produce it to the committee?

Admiral WALKER. Yes; I will look it up.

The CHAIRMAN. Have these stockholders been consulted by anybody as to what they would take for their stock?

Admiral WALKER. I don't know what has been done in that way.

The CHAIRMAN. Do you know anything about the price they ask for it?

Admiral WALKER. The last sales were for about 60.

The CHAIRMAN. Sixty?

Admiral WALKER. Yes; so I am told.

The CHAIRMAN. Premium?

Admiral WALKER. About \$60 a share, the par being \$100. The company paid no dividends for several years until two or three months ago, or a short time ago, when they paid a 2 per cent dividend. Before that they had paid none since 1893, I think, but I am not positive as to dates.

The CHAIRMAN. They have been earning money all this time?

Admiral WALKER. Yes, and they have been spending it in improving their road in various directions. They built a large pier at La Boca.

The CHAIRMAN. You spoke of their running steamships. How many do they own?

Admiral WALKER. Three, the *Alliança*, the *Vigilância*—I do not remember the name of the other one at this moment.

Senator MITCHELL. The company is in debt \$1,500,000 for building that pier?

Admiral WALKER. Yes; they owe a certain amount on it, that they are paying off with the profits of the road.

The CHAIRMAN. Where do these ships that they own run?

Admiral WALKER. A weekly line between New York and Colon. They own three ships, and they have chartered another, the *Orizaba*. They leave New York every Tuesday and Colon every Tuesday.

The CHAIRMAN. Do they run west of the bay of Panama anywhere?

Admiral WALKER. I don't know whether they are at this time, but they have been running a line of steamers between Panama and San Francisco—chartered steamers.

The CHAIRMAN. Have you ever seen the agreement between the Pacific Mail Line and the Panama Railroad Company?

Admiral WALKER. No, sir.

The CHAIRMAN. You have been aware of it, have you not?

Admiral WALKER. I have no positive knowledge of the matter, but my understanding is they had an agreement, but that it was terminated sometime ago, and that now they have no agreement with them whatever.

The CHAIRMAN. Who is the president and who the vice president of that company? I want to summon them as witnesses.

Admiral WALKER. The president is a Mr. Simmons, of New York, and the vice-president is Mr. Drake.

The CHAIRMAN. Do you know Mr. Drake's given name?

Admiral WALKER. I do not, but I have it in the office. The report of the Panama Railroad Company will give it to you.

Senator HANNA. J. Edward Simmons is the president.

The CHAIRMAN. What do you know about any lottery bonds that were issued by the old Panama company?

Admiral WALKER. The old company issued some lottery bonds and there are some outstanding now, I think. They draw from time to time, redeem them from time to time. It is a scheme of issuing bonds that is not known in this country, I believe.

The CHAIRMAN. Can you describe it?

Admiral WALKER. No, sir, I can not. I have read about it.

Senator HARRIS. Is the old company or the new company paying off these bonds.

Admiral WALKER. It is the old company, I think. They were issued by the old company, and I think they are paid off by the old company.

Senator HARRIS. Where does the old company get any funds?

Admiral WALKER. There was a fund made at the time that was put into the hands of trustees, perhaps, and from time to time a certain amount of these bonds were drawn. I have seen a statement with regard to them, but I can not speak from any accurate knowledge now.

The CHAIRMAN. Was that lottery arrangement chartered by the Government of France?

Admiral WALKER. It was authorized by the Government, I think.

The CHAIRMAN. For this particular company?

Admiral WALKER. Yes; so I understand. I do not speak with positive knowledge.

The CHAIRMAN. Can you give the committee any idea of how it is conducted, upon what basis, and in what manner?

Admiral WALKER. I can not tell you. While I have some ideas about it, I can not pretend to speak with any accurate knowledge.

The CHAIRMAN. About how much in round numbers have they issued?

Admiral WALKER. That I do not know.

The CHAIRMAN. Who redeems these bonds?

Admiral WALKER. They are redeemed under some agreement they have; I don't know just how.

The CHAIRMAN. The only reason I am so particular in inquiring is that these Americans who have been writing here claim to hold some of these lottery bonds.

Senator KITTREDGE. They were issued by the old company.

Admiral WALKER. They were issued by the old company.

The CHAIRMAN. So you made no inquiry?

Admiral WALKER. We have made inquiries with regard to them, but I can not speak with any positive knowledge of the matter. That was looked up very carefully once by General Ernst, and I knew more or less about it at the time, but I can not speak now.

The CHAIRMAN. What do you know about any terms intended to be offered or any proposition that has been made, or is intended to be made, by the Government of Colombia for making concessions to the United States in reference to a canal at Panama or any other place?

Admiral WALKER. That is a matter for the treaty-making power with which I have nothing to do.

The CHAIRMAN. You decline to answer?

Admiral WALKER. I don't decline to answer. I simply say it is a matter for the treaty-making power with which I have no concern.

The CHAIRMAN. I have asked you what you know about it.

Admiral WALKER. I know in an informal way something about it.

The CHAIRMAN. What do you know about it?

Admiral WALKER. I know something about the chances of concessions, but I can give you no particular information about it. I do not think anybody else can just now.

The CHAIRMAN. Have you stated the extent of your knowledge upon the subject?

Admiral WALKER. No, sir; I don't know that I have.

The CHAIRMAN. Will you please state it?

Admiral WALKER. No, sir; I decline to do it.

The CHAIRMAN. Why do you decline?

Admiral WALKER. Because if I knew anything, any matter of treaty negotiations that was going on between the State Department and Colombian Government, I would have no right to divulge it; it would be confidential, and I could not talk about it.

The CHAIRMAN. Have any propositions been made to the State Department?

Admiral WALKER. For information as to that I shall have to refer you to the Secretary of State.

The CHAIRMAN. Do you know whether they have or not?

Admiral WALKER. I decline to answer anything of that sort.

The CHAIRMAN. How is it that you can recommend us to pay \$40,000,000 when you know, and will not state, what the Colombian Government offers?

Admiral WALKER. I have not said I knew and would not state. I said I decline to talk on that subject.

The CHAIRMAN. Is it a subject so sacred that a witness on the stand before a Senate committee can not speak of it?

Admiral WALKER. That is a matter of one's own judgment.

The CHAIRMAN. Well, perhaps not.

Admiral WALKER. Well, perhaps it is.

The CHAIRMAN. We will have to refer this matter to the Senate, and ask the Senate to say whether you shall answer the question.

Admiral WALKER. All right, sir; I have not the slightest objection to your doing so.

The CHAIRMAN. Are you a diplomatic agent of the Government?

Admiral WALKER. Not that I am aware of.

The CHAIRMAN. If you were, you would know it?

Admiral WALKER. Yes, sir.

The CHAIRMAN. You are not?

Admiral WALKER. No, sir.

The CHAIRMAN. What you know is as a private citizen.

Admiral WALKER. Perhaps so; yes, sir.

The CHAIRMAN. And you decline to state it.

Admiral WALKER. Yes, sir.

The CHAIRMAN. Now, gentlemen, you may take the witness.

Senator HANNA. I would ask right in that connection: What you mean by a "private citizen" is that you are acting in your official capacity as president of the Commission.

Admiral WALKER. I am here as president of the Commission, and anything that I may know about matters of treaties and concessions with the Colombian Government or with Nicaragua or Costa Rica came to me as president of the Commission and not as a private citizen with no Government connection.

Senator HANNA. At the close of the report of the Commission the following language is used:

There are certain physical advantages, such as a shorter canal line, a more complete knowledge of the country through which it passes, and lower cost of maintenance and operation in favor of the Panama route, but the price fixed by the Panama Canal Company for a sale of its property and franchises is so unreasonable that its acceptance can not be recommended by this Commission.

After considering all the facts developed by the investigations made by the Commission and the actual situation as it now stands, and having in view the terms offered by the New Panama Canal Company, this Commission is of the opinion that "the most practicable and feasible route" for an isthmian canal, to be "under the control, management, and ownership of the United States," is that known as the Nicaragua route.

That is the language of the Commission which closes your report.

Admiral WALKER. Yes; the report proper.

Senator HANNA. Now, as I understand this phraseology, the first section relating to the physical advantages, the shorter route, and the reasons given indicate your preference for the Panama Canal Company route, but owing to the conditions of the price asked you decide in favor of the other?

Admiral WALKER. Yes; we considered the price unreasonable; that it was so much so that we could not recommend it.

Senator HANNA. You consider forty millions as reasonable.

Admiral WALKER. I consider forty millions reasonable.

Senator HANNA. Had the price at that time been \$40,000,000, what in your judgment would have been the report of the Commission?

Admiral WALKER. I think it would have been in favor of Panama.

Senator HANNA. For the reasons above stated—owing to the physical advantages and the shorter line?

Admiral WALKER. And various other reasons.

Senator HANNA. Which led you to that conclusion. Now, in coming to that conclusion, I would like to have you state as briefly as you please the reasons for your decision as embraced in that language, in your own way.

Admiral WALKER. In this report?

Senator HANNA. In this report.

Admiral WALKER. Well, the thing that turned us, that influenced us to report in favor of the Nicaragua route was the unreasonable price at which the Panama property was held, and we could get no intimation that they would sell it for anything less.

Senator HANNA. That was the concluding matter; but in arriving at the first conclusion, which is if the price had been forty millions you would have recommended the Panama route, what were the reasons that led you to that conclusion?

Admiral WALKER. To start with, the route has better harbors; it is a much shorter canal, has easier curves, and we are much surer by that route of what we are doing. While we made a very careful examination of the Nicaragua line, as thorough an examination as perhaps is ever made or likely to be made before undertaking a new enterprise—

Senator HANNA. Right there let me interrupt you. You also had the advantage of all previous surveys made by the United States Government of the Nicaragua route?

Admiral WALKER. Yes. We know far less about the Nicaragua line than we do about the Panama line. It is impossible to know as much. The Nicaragua line is in a comparatively wild country which has not been explored and examined to anything like the same extent that the Panama line has. The Panama line has been a great thoroughfare, traveled for two or three hundred years; it has been examined with reference to a canal for many years past, thirty perhaps, and the country along the line is cleared up so that one can see what he is doing. In the wild parts of Nicaragua it is a jungle, where often we could not see 50 feet, and we would be much more likely to meet disagreeable surprises by the Nicaragua line than by the Panama line. The chances of mistakes of various kinds are much greater by the Nicaragua line than by the Panama line, because it is not so well known. We took everything into consideration, and I think the members of the Commission would have undoubtedly reported in favor of the Panama line in this main report if they had had the same offer from the Panama Company they have now. I have not a doubt of it.

Senator HANNA. In your examination yesterday a good deal of stress was laid upon the differences in the estimated cost of harbors, of dams,

of cuts, and such work as would necessarily be done on both routes; comparisons were made as to the estimated cost of these various things. For instance, the dam at Bohio was shown to be of greater cost than the one to be constructed on the Nicaragua route, and the cost of the harbor at Colon at a greater cost than the one at Greytown; the cut at Culebra, a very expensive piece of work as compared with certain construction on the Nicaragua line. In making those comparisons the effort seemed to be to show the difference in cost of constructing the canal by amplifying these details, that it was greater on the Panama than on the Nicaragua route. Now I ask you: Is it not a fact that all these differences, pro and con, were taken into consideration in arriving at the sum total, and a balance was struck as to which canal could be constructed ready for operation at a certain price, and the showing is, upon your estimates, that the Panama Canal in its entirety can be completed at about \$5,000,000 less than the Nicaragua?

Admiral WALKER. The Panama Canal can be completed for about \$144,000,000, the Nicaragua Canal for something over \$189,000,000.

Senator HARRIS. \$184,000,000 for the Panama, adding the \$40,000,000?

Admiral WALKER. The cost of the completion of one is \$189,000,000 and of the other \$144,000,000. Now, to the price for completing the Panama Canal must be added the price of acquiring the property, whatever it is. In this case it is \$40,000,000.

Senator HARRIS. May I just ask a question? I hope, Admiral, you did not understand my questions yesterday as indicating that the total cost of the Nicaragua line was less than the cost of the Panama?

Admiral WALKER. Oh, no; I did not understand that.

Senator HARRIS. But that the cost of vital portions of the work was greater in the Panama than in the Nicaragua line.

Admiral WALKER. There are two points on the Panama line; first, the great Culebra cut, on which a large portion of the sum required for completing the canal would be expended. It is a great work, very much condensed. Then, the Bohio dam is an expensive dam, but, as I said yesterday, we estimated on a dam that we felt sure would be perfectly safe, although the cost was very great. Now, it does not follow at all that the engineers, when they make a very careful detailed examination of that section, may not finally conclude to build a different dam, and a much cheaper dam; that may or may not be the case.

Senator HARRIS. The fact is with regard to the Bohio dam, that the future of that is just as much an unknown quantity as the future of the dam at Conchuda?

Admiral WALKER. I should say it was more of an uncertain feature. It is a greater work and a more difficult work to build. The Conchuda dam I look upon as practically settled.

Senator HARRIS. So that we know no more about the possibilities and contingencies at Bohio than we do at Conchuda; in fact, less.

Admiral WALKER. We know less about the contingencies at Bohio, but that is the only point in the whole line about which we are at all uncertain.

Senator HARRIS. But that is the vital point.

Admiral WALKER. That is the vital point. Yes, it is vital to the canal, because the safety of the canal depends on the integrity of the dam in both cases.

Senator HARRIS. And the control of the river?

Admiral WALKER. Yes.

Senator HANNA. You yourself have no question about the feasibility of constructing the dam?

Admiral WALKER. I have none at all. I think it can be constructed. We had on our Commission three men who have had very large experience in putting down deep foundations and they had no hesitation about saying that the dam could be built.

Senator HANNA. In that connection, speaking about deeper foundations, is it not entirely feasible by the freezing process to go to almost any depth?

Admiral WALKER. I believe it is.

Senator HANNA. I have had experience in that by sinking a shaft a good deal deeper than this, by freezing it.

Senator HARRIS. Oh, a shaft; yes.

Admiral WALKER. In making up our estimates, we took the ground that we were going to make everything safe with both routes.

Senator HANNA. Now, right there: This Commission entered upon this work under instructions from the United States Government without prejudice, with an open mind, to discharge their duty, which was to ascertain and recommend to the United States Government or the President of the United States, which in their judgment was the most feasible and practicable route over which to construct a canal across the isthmus of Panama?

Admiral WALKER. Yes.

Senator HANNA. And, having entered upon that work under those conditions, you have given no advantage in your calculations to either of those?

Admiral WALKER. No, sir.

Senator HANNA. From prejudice or preference, except as merit may have demonstrated.

Admiral WALKER. We have done that, and in some cases that has borne rather hardly; in one case particularly it has borne rather hardly on the Panama route. The Commission insisted upon a dredged channel out into Panama Bay of 35 feet at low water. There the rise and fall of the tide is so great that it is not really necessary to go to such great depth. We could take advantage of the tide, but we concluded to make it the same depth at low water everywhere. That bore a little hard on the Panama line at that point, because it was expensive.

Senator HARRIS. Taking the 6-fathom line of depth at terminal points?

Admiral WALKER. Yes; at low water.

Senator HANNA. With reference to the dam on the Panama Canal, do you consider that the capacity for storage of water is adequate?

Admiral WALKER. Oh, yes.

Senator HANNA. For all purposes for which the canal is needed?

Admiral WALKER. Yes; there will be a surplus of water a good deal of the year, but there will be plenty at all times.

Senator HANNA. The area of that dam is stated to be about 30 square miles, I believe, in the testimony?

Admiral WALKER. The area of the lake, you mean?

Senator HANNA. Yes; and that is sufficient storage for all the needs of the canal. Now, testimony has been furnished here to the effect that the sediment in the Chagres River is so great, carried in solution, that probably within twenty years that lake would be entirely filled up. What is your judgment about that?

Admiral WALKER. I do not think so at all.

Senator HANNA. What is the nature of the surroundings and environments of the Chagres River. Are they wash banks?

Admiral WALKER. The Upper Chagres, that would come into this

lake, is a clear stream, not a sediment-bearing stream. The Lower Chagres is a sediment-bearing stream.

Senator HANNA. I had in mind the water that would come into this lake.

Admiral WALKER. That would be clear. The water would be backed up above Las Cruces.

Senator HANNA. In your judgment, there is nothing in the proposition that this lake would fill up to any appreciable extent from sediment?

Admiral WALKER. Not at all.

The CHAIRMAN. Have you ever been up the Chagres above Alhajuela?

Admiral WALKER. Yes.

The CHAIRMAN. How far up?

Admiral WALKER. I can not say exactly. I went 3 or 4 miles, perhaps, above Alhajuela.

The CHAIRMAN. As far as Las Cruces?

Admiral WALKER. Oh, far above Las Cruces, which is some miles below Alhajuela.

The CHAIRMAN. What season of the year was it?

Admiral WALKER. We were there in the dry season; went up on horseback and came down in large canoes, large boats. It was right in the height of the dry season. So that into this lake there would be water pouring all the time. It is possible that towards the end of the dry season there might not be as much water coming into the lake for a month or two, perhaps, as would go out of it from the uses of the canal and from evaporation; but we allow for a large amount of storage, so that the fact of losing water would not trouble us at all.

Senator HANNA. Another witness has testified that at some point in the Panama Canal at a depth of about 8 feet below the surface, they struck a material which he described as a volcanic material and which they found impossible to blast, owing to the fact that because of the homogenous spongy nature of the material the action of dynamite produced but little or no effect, and that in order to excavate deeper than the 8 feet to the full depth required for the canal, they would be obliged to build cofferdams and virtually cut it out by some machinery or process and dispose of it in that way without blasting. Do you know of any such condition?

Admiral WALKER. I never heard of anything like that.

Senator HANNA. You naturally would hear of it if it had been there?

Admiral WALKER. I should have been likely to.

Senator HANNA. That witness further stated that the engineers and workmen in charge abandoned the effort at that point to deepen the canal. Did you ever hear of anything of that kind?

Senator HARRIS. Excuse me. What witness do you refer to?

Senator HANNA. Commander Young, the naval officer. He admitted that he was not an engineer and knew nothing about it. He said he had a talk with the engineers, whose names he could not remember, and that they told him that such was the fact, and that he sounded the depth and ascertained that it was 8 feet down from the top of the soft mud to the top of this material which they could not blast. Do you know of any physical conditions along the whole length of the canal that present any difficulties which can not be overcome with the usual methods?

Admiral WALKER. I know of nothing of the kind.

Senator HANNA. I am talking now about the Panama route.

Admiral WALKER. I know of nothing along the Panama line which is not well within engineering precedents, with the exception of the dam at Bohio, which is a very large work and would have to be carefully considered.

Senator HANNA. You were questioned yesterday about this cut—about taking care of the water—and you stated that in order to provide against any emergency by disintegration, because of the contact with water of that clay soil, that a wall would have to be built on either side of the canal that would be a sufficient protection to the canal proper and ought to prevent any destruction of that nature from surface water; that it could all be carried off in ditches.

Admiral WALKER. You have two things confounded. The wall is to protect the sides of the cut under water.

Senator HANNA. I meant that.

Admiral WALKER. That is all right, and is undoubtedly everything that is necessary. The ditches, or whatever is resorted to for the drainage, are to drain the top of the hill, the surface of the hill where the material is of a clayey, soft nature, and might have a tendency to slide.

Senator HANNA. That is done everywhere where those conditions occur, in the Isthmus of Panama or anywhere else.

Admiral WALKER. That is common.

Senator HANNA. A very common condition; yes, sir. Now, with reference to the harbor: The harbor at Greytown, while it costs less in construction, you say will cost a great deal more in maintenance?

Admiral WALKER. Our estimate for the maintenance of Greytown Harbor is \$100,000 a year.

Senator HANNA. And for Colon how much?

Admiral WALKER. Thirty thousand dollars.

Senator HANNA. And Panama Harbor?

Admiral WALKER. Nothing.

Senator HANNA. And what is the other harbor?

Admiral WALKER. Brito; \$50,000 a year.

Senator HANNA. Speaking about the curvatures in the Panama route, it has been stated before this committee that there is one curve of about 3,000 feet radius?

Admiral WALKER. Something over 3,000 feet. That is at the entrance of the canal. That is passing from the present harbor of Colon into the canal.

Senator HANNA. And that is through a channel?

Admiral WALKER. That is through an artificial channel.

Senator HANNA. How is that channel made?

Admiral WALKER. That is a dredged channel and is made very wide, from 500 to 800 feet wide.

Senator HANNA. What is the character of the bottom?

Admiral WALKER. Just around the point where the turn would be made I think it is rock.

Senator HANNA. And the full width of the channel would be what?

Admiral WALKER. It is from 500 to 800 feet. It commences at 800 feet at the outer end and gradually draws in to 500 feet, so that the fact of its being a sharp curve does not count, because there is plenty of room to make the turn in this broad channel.

Senator HANNA. In fact, you have made all the curves in both routes easy enough, so that it is feasible for a vessel to make the turns.

Admiral WALKER. Under all ordinary circumstances a steamer with her own steam would go right along through either canal, according to

our plan. The advantage would be in the Panama canal because the curves are easier.

Senator HANNA. Some importance has been given to the fact that in Panama Bay, for lack of wind, it would be very difficult for vessels to get out to sea. Those conditions obtain generally or occasionally?

Admiral WALKER. Generally. It is a region of light winds. The trades are interrupted by the range of mountains.

Senator HANNA. Of course, that would only apply to vessels under canvas?

Admiral WALKER. Yes.

Senator HANNA. Now, as to the expense to the vessel of passing through the canals, respectively: If a vessel under canvas were to pass through the Nicaragua Canal, it would have to take a tug or two, perhaps, from the entrance to the canal until it was through into the Pacific Ocean?

Admiral WALKER. Yes.

Senator HANNA. The distance would be about 200 miles?

Admiral WALKER. About 184 miles.

Senator HANNA. Well, they would tow out some little distance?

Admiral WALKER. Not much.

Senator HANNA. Well, say 184 miles. Now, supposing a tug took hold of a vessel under canvas at Colon and towed her 184 miles, would she be outside of this doldrum?

Admiral WALKER. Out from the Panama Canal?

Senator HANNA. Yes.

Admiral WALKER. She would be well out, clear of the land, and ought to get a breeze.

Senator HANNA. That is, when she got to that point the conditions would be probably as favorable as the other route.

Admiral WALKER. They would be favorable; she would have winds. She would then be 140 miles at sea, nearly that—yes, 130 odd miles.

Senator HANNA. So that the cost of the vessels, which of course they pay, for the towage would not be any more by the Panama than by the Nicaragua route, if you towed out that far.

Admiral WALKER. Tow the same distance, and in fact the charge for towage should be smaller that way, because the moment they pass out of the Panama Canal they would go at full speed.

Senator MITCHELL. How is it at the other end, respectively, Greytown and Colon, about getting out and coming in?

Admiral WALKER. The conditions would be practically the same, the trade winds at both would be practically the same. Senator, if you will allow me, the lowest depression is across by Lake Nicaragua, and that is practically right in the line of the trade, and the trade draws through there. Now, by Panama, the line of the canal is practically perpendicular to the line of the trade winds, so that coming through the canal at Panama you would have very little wind, it being broken by the mountains, and going through the canal by Nicaragua you would have winds all the way, and winds after you went out.

Senator HANNA. If you would have no winds in the Panama Canal and the curves being much easier in the canal proper, one tug would take a vessel through there very comfortably.

Admiral WALKER. One tug would take a vessel through unless she was a vessel so large that she wanted a small tug to help steer her.

Senator HANNA. The same thing would apply in the other case?

Admiral WALKER. Yes.

Senator HANNA. But it would be more of a necessity in the Nicaragua route if you had the winds?

Admiral WALKER. More of a necessity in the Nicaragua route, perhaps, because there are more and sharper curves and you are likely to have more wind by the Nicaragua route; but under ordinary circumstances I should not look upon the wind as being likely to be strong enough to cause any particular trouble to the ship. Perhaps a very large ship that took all the canal would have to be handled more carefully through the Nicaragua line.

Senator HARRIS. Until you get up to the lake the canal and river are flanked by mountains to such an extent that the winds would not amount to anything?

Admiral WALKER. The wind draws right through the depression, you know—right through that valley.

Senator KITTREDGE. The witness Menocal, in his statement, submitted a table showing the relative curvatures in these routes. I show this to you and ask you to make any statement you care to regarding it.

Admiral WALKER. There is another table; we have a table in our report somewhere that is a better table to talk from than that, I think. I have a copy of it here.

Senator HANNA. He quoted that as your table, I think.

Admiral WALKER. Yes; this is the same table. You know the amount of curvature in either canal does not count for much if the curves are easy so that a ship passes around them readily.

Senator HARRIS. This shows the degree of curvature primarily is greater in the Panama line than in the Nicaragua line.

Admiral WALKER. Well, the point about that is perhaps that there is a long part of the Nicaragua Canal which has no curves in it, the lake, for instance.

Senator HANNA. I think it is hardly a fair comparison.

Admiral WALKER. The only way you can compare the curvatures is to compare the sharpness of the curves.

Senator HARRIS. It depends upon whether that is based simply on the canalization or on the whole route.

Senator HANNA. Yes.

Senator KITTREDGE. That is the point I am getting at. State whether or not the statement made by Mr. Menocal did not include the lake, as well as the canal proper.

Admiral WALKER. I don't know what his statement includes, I am sure. I should have to read it up to see. There is one curve on the Panama line—the curve where you pass into the canal from the Bay of Limon—that is sharper than any curve on the Nicaragua line, but that is the only one that is, and there are a considerable number of curves on the Nicaragua line that are sharper than any others on the Panama line. The curves on the Panama line are all easy curves, with the exception of the one at the eastern entrance, and there we have made the channel wide so that it would give no trouble at all.

The CHAIRMAN. You have done the same thing on the Nicaragua curves, too.

Admiral WALKER. We have widened them all to a certain extent.

The CHAIRMAN. As wide as you thought necessary?

Admiral WALKER. Yes, we think that the average ships, or that all ships, would go through either canal without any particular difficulty under ordinary circumstances.

Senator HANNA. The difference would be, perhaps, only in the question of time of passing.

Admiral WALKER. Of course, vessels going around curves do not go at such speed as on a straight-away course.

Senator HARRIS. You give your estimate as the time required for the passage?

Admiral WALKER. Yes.

Senator KITTREDGE. In recommending the Panama route in your supplemental report, did you consider the distance, for instance, from San Francisco to New York?

Admiral WALKER. Yes.

Senator KITTREDGE. Notwithstanding the less distance in favor of the Nicaragua route, you recommend the Panama route?

Admiral WALKER. Yes; we considered all those questions and then summed up and gave the advantage to the Panama route.

Senator MITCHELL. Can you tell what is the difference in the distance between New York and San Francisco by way of the two routes?

Admiral WALKER. A difference of about one day according to our figures.

Senator MITCHELL. How many miles?

Admiral WALKER. Well, we called it a day's run for a ship going about 12 knots, and that would be a little less than 300 miles.

Senator HANNA. But to the coast of South America or Australia it would be in favor of Panama?

Admiral WALKER. For all South American business, either going or coming, the Panama route would be more advantageous by about two days. The difference in favor of Nicaragua for New York and San Francisco business is probably more apparent than real, because you are more likely to have delays in passing through a long canal than in passing through a short one. That is something we can not figure on at all, you know; we have to discard that.

Senator HANNA. With reference to ships sailing direct from New York to the Orient, would there be much difference in time on the course they would take?

Admiral WALKER. There would be a little in favor of the Nicaragua route, but not much.

Senator MITCHELL. And with ships going from Portland, Oreg., for instance, and San Francisco to Liverpool?

Admiral WALKER. There would be a little difference in favor of the Nicaragua route.

Senator HANNA. About one day.

Admiral WALKER. According to our figures; but I say that would probably be modified in practice to some extent.

Senator HARRIS. In discussing the difference, in the knowledge you have of the work to be done, of the country—and when you say “country” you mean the country as related to the work to be done?

Admiral WALKER. Oh, yes; we mean along the line of the route.

Senator HARRIS. The surveys along the Nicaragua Canal have been made over and over again?

Admiral WALKER. Yes; the route varying more or less each time.

Senator HARRIS. But generally the character of the country has been pretty thoroughly developed?

Admiral WALKER. Yes.

Senator HARRIS. And in your report you reach this conclusion, that in the character of work to be done, 57 per cent of the work to be done on the Nicaragua route is dredging, which is the cheapest possible form and the easiest kind of work to be done.

Admiral WALKER. Yes. I take it for granted you have the figures right.

Senator HARRIS. Yes, 129,000,000 yards, which is 57 per cent of the

whole work; whereas on the Panama line dredging is a comparatively small part of the work.

Admiral WALKER. I don't remember the figures, but there is a good deal of dredging to be done there. The great work is the great Culebra cut.

Senator HARRIS. There are 44,000,000 cubic yards in the Culebra cut alone.

Admiral WALKER. Yes.

Senator MITCHELL. I will ask to be excused at this point.

The CHAIRMAN. Certainly.

Senator HARRIS. Don't you think that the numerous and exhaustive surveys that have been made by the engineers prior to the Nicaragua Commission and then by the Nicaragua Commission and by the Isthmian Commission are such as practically to remove any question, reasonable question, as to these unknown dangers?

Admiral WALKER. No; I don't think so.

Senator HARRIS. Except, of course, that in any great work there are possible contingencies.

Admiral WALKER. We have put in a contingency of 20 per cent to guard against that thing. I don't think it is high. Our line is somewhat different from any other. Of course, the Menocal line is abandoned altogether; we abandoned that with the Nicaragua Canal Commission.

Senator HARRIS. Except so far as the lake and river navigation is concerned.

Admiral WALKER. The lake remains the same, but nothing else.

Senator HARRIS. Well, the upper part of the river.

Admiral WALKER. We have changed the line in the upper part of the river. We have made cut-offs, and shortened it up a good deal. His dam was an impossible dam, and we put in a dam in an entirely different location—a far better location.

Senator HANNA. I want to ask about that Menocal line. When was that survey made, if you recollect?

Admiral WALKER. They were surveying off and on for years. I can not tell when he made his final survey; it is all in this report.

Senator HANNA. You say you abandoned that line or any consideration of it. Why?

Admiral WALKER. Because we looked upon it as impracticable. He proposes to put a dam across the river at Ochoa, a rock-fill dam where the foundation was so deep that nothing would ever get to the bottom—proposes to build it by dumping in rock.

The CHAIRMAN. Did not Mr. Morison propose the same kind of a dam at Bohio?

Admiral WALKER. Oh, no; quite a different dam.

The CHAIRMAN. A rock-filled dam.

Admiral WALKER. Oh, no.

Senator HARRIS. It was composed of rock and earth. In that sense it was the same.

Admiral WALKER. Yes; but the plan of the dam was entirely different.

The CHAIRMAN. I am speaking about a rock-filled dam. Is that an impracticable sort of dam to build?

Admiral WALKER. The dam Mr. Menocal proposed we considered impossible.

The CHAIRMAN. I know that. I want to know whether a rock-filled dam is impracticable.

Admiral WALKER. It depends where you put it. In some places it would not be and in other places it would.

The CHAIRMAN. That is not a form of dam discarded by engineers?

Admiral WALKER. No; I don't know that it is. It would do well enough in certain places, but the reason we abandoned the Menocal line was because of this dam which we did not consider safe at all, considered impracticable, and because of the enormous embankments necessary in his plan for carrying his upper level from the river east to within 12 miles of the sea at Greytown, commonly called the San Francisco embankment line.

The CHAIRMAN. Let me ask whether those embankments are larger in cubic yards than the embankments you propose to put on either side of the canal to fence out the waters of the Chagres?

Admiral WALKER. Much larger.

The CHAIRMAN. How much larger?

Admiral WALKER. Far larger. I can not tell you how many times larger; but they were far larger, and they were on ooze, in which there was nothing solid to build upon except at a great depth. For instance, we had boring parties in one of these streams in the mud to try and find out where the rock was. They took a little iron pipe and stood it on end, and it ran down of its own weight some 85 feet.

Senator HANNA. Was Mr. Menocal the engineer of the Maritime Canal Company?

Admiral WALKER. Yes.

Senator HANNA. Did he have to do with the origin of that company and the beginning of that work?

Admiral WALKER. He was their engineer for a long time. He had to do with this Nicaragua business, and was sent down there to get concessions.

Senator HANNA. And spent some time in surveying?

Admiral WALKER. Yes.

Senator HANNA. Was it because of the impracticability of his route and his work that the thing was abandoned, do you think?

Admiral WALKER. No, sir; the company went to pieces, failed; but the engineers that I have been associated with since I have been on this work have all regarded his plan as a brilliant plan in theory, but as an impracticable plan.

The CHAIRMAN. Let me ask you right there. The route that you surveyed as the president of the Nicaragua Commission and also as the president of the Panama Canal Commission is the same route practically that Mr. Ludlow laid down?

Admiral WALKER. I don't know that Ludlow laid down any route. Ludlow's board was a board——

The CHAIRMAN. I beg your pardon. I do not mean Ludlow; I mean Lull.

Admiral WALKER. It is along the same line, but on a very different plan.

The CHAIRMAN. The plan is different but the line is the same.

Admiral WALKER. Not the same, but within reasonable limits it is the same.

The CHAIRMAN. Now, Mr. Menocal surveyed that line, did he not?

Admiral WALKER. Mr. Menocal was an assistant to Lull.

The CHAIRMAN. I beg your pardon, he was chief engineer of the party.

Admiral WALKER. He was one of Lull's assistants and as an engineer worked upon that line, and he was there at different times afterwards on his own hook without anybody over him.

The CHAIRMAN. Very good. But in both the surveys you made there you have practically adopted the line that Mr. Menocal first run there.

Admiral WALKER. We might be said to have adopted the line with very large variations.

The CHAIRMAN. Very good. But the general line is the same.

Admiral WALKER. We leave the river at a very different place and a good deal farther up; we build a dam farther up in quite a different place, and we run our line all the way down at a different location from the Menocal but generally in the same section, because you can not get very far away from it if you keep in the valley, which is generally narrow.

The CHAIRMAN. This is the same wilderness country you spoke of as being in Nicaragua?

Admiral WALKER. Yes.

The CHAIRMAN. The country west of the lake is not a wilderness country.

Admiral WALKER. No, sir; it is comparatively open.

The CHAIRMAN. The part where the jungle is and all that, is where?

Admiral WALKER. East of the lake.

The CHAIRMAN. And is the part that Mr. Menocal first surveyed and that you afterward twice surveyed?

Admiral WALKER. The country east of the lake is all a jungle.

The CHAIRMAN. Very good.

Senator HARRIS. The first survey was Child's survey. That was really the best.

Admiral WALKER. That was the best survey that was made up to the time of the Nicaragua Commission.

Senator HARRIS. I think that that was the foundation for all the best surveys.

Admiral WALKER. Yes.

Senator HANNA. So it was not Mr. Menocal's line, after all.

Admiral WALKER. Oh, it was Child's. Child's was the original, and his survey was the best survey made up to four or five years ago.

Senator KITTREDGE. To what extent has the proposed Panama route been uncovered?

Admiral WALKER. It has been more or less uncovered you may say through its entire length.

Senator KITTREDGE. Has it been uncovered to the extent that it is readily seen what work there is to do.

Admiral WALKER. Yes; the country has been cleared along the line and is now a comparatively open country, so that as you pass along the line of the canal you can see just what you have to do, and in the more important part of the work—the great Culebra Cut—the French engineers have sunk test pits below the bottom of the proposed canal.

Senator HARRIS. You say you take out the upper level of the French plan?

Admiral WALKER. Yes.

Senator HARRIS. Have their test pits gone down to what would be the bottom of the summit level?

Admiral WALKER. I think not below the summit level of our plan, but it is below the summit level of their plan; it shows what the material is, and we tell in our report just what it is. They have gone down far enough to be perfectly sure of the character of the material.

The CHAIRMAN. As far down as they have gone, is it the same material, soluble in water?

Admiral WALKER. Yes; it is the same material. It is a very hard clay. It is treated as soft rock. It has to be blasted, but if a little piece is put in water it gradually dissolves, and in order to protect the perpendicular cut from the action of the water and the action of the waves of steamers passing through it we propose to line the cut on either side with a wall of stone.

The CHAIRMAN. But you do not propose to pave it?

Admiral WALKER. No.

Senator HANNA. Some consideration has been given to the health of the respective localities. It is claimed, and I presume it is true, that during the time of the construction of the Panama route there has been a great deal of sickness from fever and from other causes along the route of the Panama canal. Has that been entirely owing to the fact that it is a more unhealthy part of the isthmus than any other?

Admiral WALKER. I don't know that it is. The isthmus was very unhealthy in the early days. There was a great loss of life in building the railroad, and when they first went to work on the canal there was a good deal of sickness, but the surface material from which this sickness is supposed to come has been largely removed, and of late years it has been as healthy there as anywhere in a tropical country. I have here an extract from the report of the board of directors of the new Panama Canal Company to the shareholders, December 21, 1901. In that report they say:

The sanitary condition of our force has been as satisfactory as possible. Out of a force of agents and workmen of about 2,000 men, we have had to regret but 50 deaths, of which 44 were caused by diseases common to all countries or accidents in connection with the work. Only six deaths were due to climatic diseases.

The CHAIRMAN. When was that report made?

Admiral WALKER. Last December.

Senator HANNA. Is it not likely that in the construction of the Nicaraguan Canal, working a large force, turning up the surface of the soil and in dredging, that malarial conditions conducive to fevers would arise?

Admiral WALKER. Certainly. As it stands to-day Nicaragua is a healthier route, because there is no work of that kind being done and very few people to get sick, but when you get to turning up the ground there would be sickness there, as there would anywhere.

Senator HARRIS. With regard to that, you remember that those two routes existed prior to the building of the canal as routes to California. There was the Chagres route and the San Juan route, and even in that time people who were crossing by way of the Chagres River suffered more from sickness and disease than in crossing by way of San Juan.

Admiral WALKER. I suppose we may well say of the Panama line, as things stand now and as they stood then, that people would be more likely to contract sickness because the Panama line is a highway of travel and has been for hundreds of years, and it has two considerable towns, one at either end of the line, while the Nicaragua line has nobody, practically. Greytown is a bit of a village, and there is no other town of any consequence on the route.

Senator HARRIS. This sickness I speak of prevailed among the people going to California.

Senator HANNA. What proportion traveled by Nicaragua and what by Panama?

Senator HARRIS. Generally the same. At the time the two routes were being used as rival routes, one with the Chagres and the other with the San Juan.

Admiral WALKER. I do not see any reason to anticipate any great amount of sickness by the Panama route provided we have control and exercise it firmly and enforce proper quarantine and sanitary regulations.

Senator HARRIS. At that time, when the old Pacific Company had steamers on the San Juan River, there were more going by that route than on the Chagres.

Senator HANNA. Mr. Menocal made a remarkable statement on the question of health, that during the time he was doing the work for the Maritime Canal Company at the Greytown end of the canal there was little or no sickness among his men and that men would work in water all day up to their necks and not get sick.

Admiral WALKER. Where was that—Nicaragua or Panama?

Senator HANNA. Nicaragua.

Admiral WALKER. Grey Town is a healthy enough town. It rains practically all the time, you know, and as long as it rains it is healthy. When it stops raining for a week or two everybody begins to get sick.

Senator HARRIS. The universal proposition is that the dry season in a swampy country is unhealthy.

Admiral WALKER. Yes.

The CHAIRMAN. It is the dry season that makes Panama so unhealthy, is it not?

Admiral WALKER. I don't know that it is.

Senator HANNA. What struck me as remarkable is that they were up to their necks in water.

The CHAIRMAN. That statement is verified by numbers of witnesses.

Senator HANNA. Men working up to their necks in water?

The CHAIRMAN. Yes. There is a young man in the next room who swore to it.

Admiral WALKER. I don't believe he was ever worked up to his neck in water in the world. He was under our Commission. Our men thrashed around in the mud and water more or less, just as anybody would.

The CHAIRMAN. I don't know what the fact is. I would be sorry to think that the young man has blackened his soul with perjury. I think he has sworn to the exact truth, and I think he is a man that would tell the truth and swear to it all the time.

Admiral WALKER. I don't think he intended to say that he worked up to his neck in water, or that others did. He may have been over his head in water, but it would be as exceptional as working in water up to his neck would be.

Senator KITTREDGE. What about the supply of drinking water on the Panama route?

Admiral WALKER. There is good water on both routes.

Senator HANNA. What have you to say about the equipment of the Panama Company with reference to houses for the men, office buildings, and hospitals?

Admiral WALKER. There are fine hospitals. There are a large number of buildings erected, you may call them barracks or houses, for the workmen and their families all along the line from ocean to ocean.

Senator HANNA. I heard you say in the beginning of this conference that there was a large amount of machinery in stock which had never been used by the company, purchased for the purpose of work on the canal, dredges, locomotives, etc. Did I understand that those were not in the original proposition?

Admiral WALKER. They were not in our estimate of value, but they are in the proposition of sale.

Senator HANNA. Did you make any estimate of what the value of that machinery would be to the purchaser?

Admiral WALKER. No, sir.

Senator HANNA. It would be something, of course.

Admiral WALKER. O, yes; it would probably be worth two or three or four millions, possibly more, for construction purposes.

Senator HANNA. I don't care to ask any more questions, Mr. Chairman.

Senator KITTREDGE. What about the condition of the winds, comparatively, at Greytown and Colon?

Admiral WALKER. Practically the same, the northeast trade blows home at both places.

Senator KITTREDGE. Witnesses have spoken of severe northers at the harbor of Colon.

Admiral WALKER. They have northers at both places, both off Greytown and off Colon, but the bay of Limon, on which Colon is built, is a large open bay, and when a norther blows home it rolls the sea into the bay; it is open to the north. They have northers now and then during the winter. Occasionally they get a heavy one, and then steamers in there have to go to sea. They either run to Porto Bello, a few miles to the eastward, an excellent harbor, or they go out to sea and thrash it out until the norther has blown itself out and then come back again.

Senator KITTREDGE. Is there a serious difficulty on that account?

Admiral WALKER. There is little difficulty. It has been a harbor of commerce for a great many years, but they are liable to these interruptions occasionally. In building the canal it is proposed to build a canal harbor inside the point that the French call Christo f Colon, and which is spoken of here as a jetty, though it is not a jetty at all within the usual meaning of the term, but it is the point that acts as a break-water—it is proposed to build a harbor in there for canal purposes which would be perfectly safe. A vessel arriving in Colon to go through the canal would run around this point into the canal, where the water would be smooth.

Senator KITTREDGE. To what extent will that harbor accommodate ships.

Admiral WALKER. We estimated for it only for canal purposes, you know.

Senator HANNA. Vessels intending to pass through the canal would not stay there; they would go right on.

Admiral WALKER. Yes; we estimated for canal purposes, but allowing for a reasonable number of vessels to be lying there for repairs, or coal, or anything of that kind. I will tell you in a moment what the size of that harbor is.

Senator HANNA. Well, it is ample for that purpose?

Admiral WALKER. Yes.

Senator HANNA. That will answer the question.

Admiral WALKER. And that is precisely the same kind of harbor we proposed at Greytown. We do not propose to build a commercial harbor at Colon or Greytown, but a harbor ample for all canal purposes.

Senator HARRIS. It is about 2,000 feet by 500 to 800 feet, according to the report. That is at Limon Bay, a channel 500 feet wide at the bottom.

The committee then (at 1 o'clock p. m.) took a recess until Monday, February 10, 1902, at 10.30 o'clock a. m.

STATEMENT
OF
PROFESSOR LEWIS M. HAUPT
BEFORE THE
COMMITTEE ON ISTHMIAN CANALS,
OF THE
UNITED STATES SENATE.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Monday, February 10, 1902.*

The committee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Foster, Kittredge, Harris, Hanna, Hawley, and Mitchell.

STATEMENT OF PROF. LEWIS M. HAUPT.

The CHAIRMAN. Senator Harris, this is one of your engineering friends, and I would be glad to have you take charge of him.

Senator HARRIS. I thought it would be well to have Professor Haupt make a general statement.

The CHAIRMAN. Before you go ahead, Professor, I want to call your attention to a former statement that you made before this committee, on page 107 of a former report, for your own information.

Mr. HAUPT. In looking at the statement on page 107, I find it refers especially to the difficulties of construction of a dam at Bohio. That is one of the engineering details of the project, and with the consent of the committee, I think it would be better to have me take up the project from a broader standpoint and then to take up the engineering details subsequently.

The CHAIRMAN. Pursue your own course as to that.

Senator HARRIS. Before you begin that, I would like to have you indicate that you were on the first Nicaragua Canal Commission and then afterwards a member of what is called The Isthmian Canal; that you served on both of those Commissions.

Mr. HAUPT. Yes, answering the question of Senator Harris as to my qualifications, I would say that I have served on both of those Commissions and have been over both of the routes critically, have assisted in the preparation of estimates and reports, and feel that I am reasonably competent to give an opinion.

The CHAIRMAN. By both routes do you mean both the Nicaragua and the Panama routes?

COMPARISON OF THE ROUTES.

Mr. HAUPT. Yes. As the question before this committee is largely one of the selection of two routes, I beg leave to say that while conceding to the wishes of the majority and signing a report in order to make it unanimous, and so, if possible, to secure legislation at this session, I still feel and did then that there were certain economic, physical, engineering, sanitary, and commercial advantages inherent to the Nicaragua route which gave it a decided preference over the Panama route.

In this, of course, I do not consider the cost of the concessions nor especially the cost of constructing the canal, but I think the others are of so preponderating weight as to overbalance any differences in the latter two items. The economic advantage is, a priori, the most important factor in the operation and utility of an interoceanic waterway, and that is briefly summed up in the report of the Commission by the statement that the Nicaragua Canal possesses an advantage between home ports of one day for all north-bound commerce—that is, whether it be of European or American origin, or whether it has its destination in the Orient or North Pacific ports—and for all Gulf ports it would save about two days.

I have made an estimate of that saving based upon the average cost of moving vessels of about 3,000 tons capacity, which I have figured at about \$250 a day. Some of these vessels have cost as high as \$1,000 a day to operate and maintain, and some of them as low as \$100 a day, but taking it at that average and estimating on a basis of 10,000,000 tons, of which, say, 75 per cent is north bound, the economy on that basis would amount to about \$650,000 a year on steam alone. But as a large percentage would be carried by sail if this route be opened, the economy would probably be 50 per cent more, or about \$1,000,000.

Senator KITTREDGE. Where did you obtain the tonnage?

Mr. HAUPT. The 10,000,000 tons?

Senator KITTREDGE. Yes.

Mr. HAUPT. That is approximately the amount of tonnage which would be available at the time of the opening of the canal.

Senator KITTREDGE. From what source did you secure that?

Mr. HAUPT. That is taken from a digest which I have made of all the estimates of tonnage from the time this project was actively discussed by the commercial world.

The CHAIRMAN. Will you allow me to ask right there whether the subcommittee to which you were assigned had in charge the subject of the economic value or advantages of the canal?

Mr. HAUPT. Yes; it had.

The CHAIRMAN. You made a study of it?

Mr. HAUPT. I was a member of that committee and have been studying and working on that subject for some three years past. This statement which I have prepared is rather a long one to enter upon the minutes, but I have here a compilation of all estimates accessible to me as to the amount of probable tonnage available, ranging from Mr. Nimmo's estimates of only 300,000 registered tons up to a possible maximum tonnage in the year 1899 of 15,750,000 tons.

The CHAIRMAN. I think you had better put that statement in the record.

Mr. HAUPT. Very well; I will put that in as a part of my statement. It is as follows:

Estimates of tonnage for the Isthmus.

Year.	Authority.	Registered (tons, bulk).*	Dead weight (cargo, tons).
1857	F. W. Kelley, of New York (Nicaragua).....	3,094,070	4,640,000
1871	Geographical Congress at Antwerp.....	4,000,000	6,000,000
1876	M. Levasseur, member Institute National.....	5,268,000	7,900,000
1879	Statistical committee, Paris Congress (Panama).....	7,000,000	10,500,000
1879	Tonnage between Atlantic and Pacific ports via Cape Horn, etc....	2,671,886	4,000,000
1879	Eli Lazard and Admiral Ammen.....	4,833,000	7,250,000
1880	Joseph Nimmo, jr.....	1,625,000	2,440,000
1881	Congressional committee.....	3,291,533	4,940,000
1881	Wm. H. Webb (between 3,000,000 and 4,000,000).....	3,500,000	5,250,000
1882	Panama Canal promoters.....	6,000,000	9,000,000
1884	M. Amadie Marteau (Panama).....	7,536,982	11,300,000
1884	"Révue Gazette Maritime ect." (Paris).....	9,304,166	13,960,000
1885	Department of Statistics, United States Treasury (Nicaragua).....	4,252,000	6,380,000
1885	M. de Lesseps to Minister (tide canal).....	4,000,000	6,000,000
1887	Atlantic and Pacific coasts.....	4,507,044	6,760,000
1887	M. de Lesseps to the Premier.....	7,500,000	11,250,000
1887	Journal du Havre.....	5,780,483	8,670,000
1889	Paris Congress prediction (Levasseur).....	7,250,000	10,900,000
1889	Brunet's investigating committee (Panama).....	4,100,000	6,150,000
1890	Thos. J. Vivian, statistician (Tehuantepec).....	5,780,483	8,670,000
1890	Maritime Canal Co. (between 6,000,000 and 7,000,000).....	6,500,000	9,750,000
1890	Thos. B. Atkins, secretary Maritime Canal Co.....	8,122,098	12,200,000
1892	Estimate to date, basis Department of Statistics, United States Treasury.....	6,500,000	9,750,000
1892	Bunau Varilla (on opening Panama).....	3,500,000	5,250,000
1893	Thos. J. Vivian, revised to date (Tehuantepec).....	6,494,093	9,740,000
1894	Submitted in Senator Morgan's report.....	6,500,000	9,750,000
1895	Thos. J. Vivian to date (for Tehuantepec).....	7,262,880	10,900,000
1895	Joseph Nimmo, jr. (revised 1880).....	300,000	450,000
1897	Thos. B. Atkins (estimated to date).....	9,934,302	14,900,000
1899	Bunau-Varilla (increase to date).....	10,500,000	15,750,000
1899	W. R. Grace & Co., of New York.....	6,989,202	10,500,000
1899	The Technical Commission, Paris (Panama), about.....	5,000,000	7,500,000
1905	E. L. Corthell, prediction (Tehuantepec).....	8,071,796	12,100,000

* If gross register, then the dead-weight cargo or tonnage by weight is estimated by adding 50 per cent, giving the results in the last column.

As the canal can not well be available before 1910 under the most favorable conditions, and as it would undoubtedly create a large new business in a few years, this estimate would seem to be very conservative. The estimate of the committee on the economic value of the canal is based upon the normal growth of tonnage under existing conditions and does not take into consideration the new business which must accrue from the increased facilities afforded, as has invariably happened in all cases. The coal shipments alone would exceed 2,000,000 tons per annum.

Senator HARRIS. The Commission itself arrived finally at the conclusion that the available tonnage will be about seven million tons, has it not?

ECONOMIES.

Mr. HAUPT. I think that is at the present time the tonnage in sight. I will look that up in a moment.

The CHAIRMAN. It would be the same through either route?

Mr. HAUPT. Yes, it would be the same through either route, but the difference in cost of maintenance and operation, as stated in our report, is simply from sea to sea, which does not represent the full economy of the entire transportation of freight from port to port, because in using

the Panama route there are some 350, more or less, miles farther to traverse by sea, and it is that element which I am introducing into this estimate, the cost of that movement as an essential factor, which is represented by the one or two days, as the case may be, for the north-bound traffic.

Senator HARRIS. That is a saving in the total voyage?

Mr. HAUPT. A saving from port to port; it includes the whole cost of movement from port to port.

The CHAIRMAN. You mean, for instance, from New York to San Francisco?

Mr. HAUPT. Certainly, between the two termini, that is the measure of the advantage and utility of the canal. It does not make any difference whether one is very much shorter from sea to sea or not, and on that point, speaking from the physical standpoint, I would say that the Panama route, for the bulk of the commerce, at least 75 per cent of it being north bound and between northern termini, that the Panama route is directly away from the path of commerce or nearly at right angles to it, running from northwest to southeast, going south, so that every mile of that canal is a detour from the direct line of traffic, and that is a violation of a sound engineering and economic principle, while every mile on the Nicaragua route is in the line of or as near the line of traffic as it is possible to place it. So that the difference in the length of the route which is urged as an objection to the Nicaragua route is in reality no objection whatever.

Senator HARRIS. Right at that point, would the cost of the insurance, owing to the proposedly greater risk in the canal, be very largely increased by the Nicaragua line over the Panama line?

Mr. HAUPT. In my judgment—and this is merely an opinion—it would not, for the reason that the larger portion of the Nicaragua route is in the lake and in the river, which has more capacious channel than in the Panama route. The actual relations of canalized portions in the two routes would be about as one to two in favor of Panama. That is to say, reading from page 260 of the report, "The length in standard canal section and in harbors and entrances is 73.78 miles for the Nicaragua route and 36.41 miles for the Panama route," so that the canalized portion of the Nicaragua route is just about twice as great as that at Panama, and not four times, as the claims made would lead one to believe.

About 74 miles, therefore, in Nicaragua, and there is as an offset the avoidance of the risk of the increased sea voyage necessary to utilize the Panama route, so that I think, answering the question of Senator Harris, that the rates of insurance would not be materially different by the two routes, especially in view of the fact that the exposure by sea and shorter time required to make the trip from port to port would be in favor of Nicaragua on insurance, because the vessel is out a smaller number of days.

Senator HANNA. What would be in the proportion of risk in open sea or in navigating the canal?

Mr. HAUPT. That involves a question of storms which, of course, is purely hypothetical. The Caribbean Sea is a pretty rough sea, having a lee shore, and for sailing vessels, I think, the risks would be greater by sea than on the canal, where they would be towed and landlocked throughout, and in still waters; but for steam vessels there would probably be some greater risks in navigating a contracted channel.

Senator HANNA. What would be the proportion in the class of vessels between sailing and steam that would use the canal?

Mr. HAUPT. That also involves a much-mooted question as to the effect of the canal. Persons well versed in the statistics of the sailing vessels believe that the opening of the canal will increase the building and operation of sailing ships, and there are others who take the contrary view, but a sailing vessel could be, and would have to be, towed through the canal.

Her risk would be practically a minimum; I think it would be less in the canal than in the open sea. For a steam vessel running under her own steam, it would be greater in the canal. Now, as to the percentage of steam and sailing vessels, at present it is about an even thing as to the total tonnage of the United States. In all probability the sailing vessel will be able to hold its own, because of the greater economy in the operation of large sailing vessels and the smaller crews required to handle them. The fact that very large six and seven masted sailing vessels are in use and building is an evidence in that direction.

Senator HAWLEY. Do you know of any seven-masted vessels?

Mr. HAUPT. Yes; there is one contracted for now. The Atlantic Refining Company, with whom I am in close touch in Philadelphia, also assures me that they propose to carry their oil in sailing vessels and are doing so to-day, and then the risk of rounding Cape Horn in sending their oil to China and Japan would be saved, because they would use the canal in preference.

Senator HANNA. The factor of safety is a very large consideration there.

Mr. HAUPT. Yes.

Senator HANNA. That is, as to carrying a cargo where they have fires.

Mr. HAUPT. Yes; and so with coal and almost all of the cheap raw materials required in manufacture. It is estimated that the total coal required on the Pacific when the canal is opened would be two and a half millions of new traffic passing through the canal, and that that would go largely by sailing vessels from the Gulf and South Atlantic ports.

Senator HAWLEY. Have you spoken of the unreliability of the winds and of the calms down there?

Mr. HAUPT. No, I had not taken up the physical question as yet at all. I will touch on that now if you desire. The whole problem of opening the canal across the isthmus is to overcome the great obstacle offered by the peninsula of South America, the greatest obstacle in the world to interoceanic commerce; and in order to show the committee more graphically just what that means I have here a map of the world in which I have eliminated South America by folding it down [turning it over].

Now, that would represent the actual physical condition and availability of the route for navigation after the canal is built, showing that it would save this long detour by Cape Horn to the East for European commerce as well as for American commerce. It would shorten the distance between our Atlantic and Pacific seaports some 10,000 miles, and possesses numerous other economies which I think the map itself will suggest. There is, however, the advantage resulting from restoring South America to its original position [turning it back], in the development of the immense resources of South America, which would also contribute its tonnage to the canal.

Senator KITTEDGE. How would that traffic be affected by the Panama route as compared with the Nicaragua route?

Mr. HAUPT. For the west Pacific traffic of South America the Panama route would be the better by one day, with reference to interchange with north-bound terminals, but the statistics of the Panama Railroad have shown that of their tonnage 75 per cent comes from terminals north of Panama and is consigned to terminals north of Panama, so that you may safely say that three-fourths of the bulk is north of that latitude.

Senator HANNA. Is it not reasonable to suppose there would be a large increase in that South American portion.

Mr. HAUPT. Yes, sir. In both north and south bound tonnage, but I think in the same proportion, because the bulk of the population of the world is north of the equator. There are only about 91,000,000 of people south of the equator.

Senator HAWLEY. Do you mean in South America or in the world?

Mr. HAUPT. No, sir; I mean in the world, taking that portion of Africa and of Australia and of South America, south of the equator. I went into that question of the distribution of population pretty carefully several years ago, but I have not looked up those figures recently. My estimate I find is made up as follows: For Australasia I have taken about 90 per cent of the total, or 11,700,000; for South America about 80 per cent, or 28,300,000; and for Africa about 35 per cent, or 51,000,000. It is merely an approximation.

Senator HAWLEY. What do you give as the aggregate population of the world?

Mr. HAUPT. About 750,000,000; so that about 94 per cent of the people of the earth are north of the equator. Considering, therefore, the location and distribution of population and the interchange of commodities between them, it would seem only rational to conclude that the great bulk of the movement would prefer the route which is nearest to the markets. That is an economic principle.

AVAILABILITY FOR SAILING VESSELS.

Now, as to the difficulties of navigation of Panama Bay for sailing vessels, I think the subject has been fully covered by Commander Maury and Lieutenant Collins, and is published in the Sullivan report (Appendixes B and C, pp. 145, 149), in which there is given a map showing the route which must be followed by sailing vessels to make the best time, as well as tabular statements of the saving by the various routes.

Senator HAWLEY. Published in what?

Mr. HAUPT. In the Sullivan report. That map shows that in order to utilize the Panama route, transshipping by rail, a sailing vessel going out from Panama Bay, in order to make the best time for San Francisco, must sail south to or near the Gallapagos Islands, which are on the equator, and thence west for about 1,500 miles, in order to take advantage of the winds and currents, and run for San Francisco, and the economies in time in both directions are stated carefully in tabular form in that Collins report.

I have a copy of a portion of it here, but I will not take the time to refer to it at present, because it is already accessible for reference. It has also been stated to me by residents of Panama, confirmed by the consular reports in which it is printed, that vessels have been longer in getting out of that bay and reaching their port of destination, Valparaiso or San Francisco, than the time required to sail from New York via Cape Horn.

Senator HAWLEY. Getting out of Panama Bay?

Mr. HAUPT. Yes. These are exceptional cases, however; but the usual time is from two to three weeks in getting out of the bay.

Senator HANNA. You say that all sailing vessels will have to be towed through either canal?

Mr. HAUPT. Yes.

Senator HANNA. Taking the difference in the distance of the length of the two canals, from Greytown on Nicaragua away down to the Pacific and from Colon to the Pacific, would it cost any more to tow a vessel outside of Panama Bay than it would to tow her through the Nicaragua Canal?

Mr. HAUPT. I think the towage would be nearly doubled in length via the Panama route. It would cost more, as they would have to be towed out of Panama Bay and even beyond that, possibly 400 miles, before reaching a fair wind at certain seasons, since this is in the zone of equatorial calms, while Brito is not, and there the winds are generally offshore.

Senator HANNA. What distance?

Mr. HAUPT. It is estimated they would have to be towed some 400 miles after getting out of the canal itself.

Senator HANNA. Who makes those estimates?

Mr. HAUPT. They have been estimated by physical hydrographers, who have looked into the question. It is my own estimate and the estimate of others who have looked into the question of the difficulties of striking favorable winds or currents. The currents from Panama Bay are southward. There is a slight current—I do not have the map here to show that, but would refer to the Berghause Physical Map of the World as showing the currents in that bay.

Senator HARRIS. You say that Maury and Collins state that they would have to go pretty nearly to the Gallipagos Islands?

Mr. HAUPT. Yes; that is down on the equator, and that is 10° south, which would be nearly 700 miles.

Senator HANNA. How long ago was that report made?

Mr. HAUPT. The Sullivan report, I think, was made after the close of the second Grant or Hayes Administration, which would bring it about 1882 or 1883.

Senator HANNA. What are the facts with reference to vessels now in that particular with reference to taking that route?

Mr. HAUPT. Minister Merry states an experience in that section, had by the navigator of the Pacific Mail steamship *Golden Eagle*, who cites an instance of a vessel that was 40 miles out of Panama bound in and which he passed outward bound for San Francisco. He made his round trip, and when he returned the vessel was still bound in and still 10 miles from port, having made but 30 miles.

Senator HANNA. But then if there was a tug there to tow her she would not have been there.

Mr. HAUPT. Certainly. I am speaking of the natural conditions.

Senator HANNA. The point I started to make was that if there had been a canal there through which sailing vessels would pass there would be tugs to take them through the canal.

Mr. HAUPT. Yes.

Senator HANNA. And, of course, available to take vessels as far out as they need go to get the winds.

Mr. HAUPT. Yes, and it might be 400 or 500 miles or more.

Senator HANNA. In the Great Lakes we tow vessels 400 or 500 miles for \$100 or so.

Mr. HAUPT. That is a common practice now, also, along the Atlantic coast.

Senator HAWLEY. What is that, Mr. Hanna?

Senator HANNA. A vessel would have to pay a tug to take her through the canal and the passage of the Panama Canal at 50 miles, and you add the difference in the distance of the length of the Panama and the Nicaragua routes and you take a vessel out to sea or through the Bay of Panama enough to make the distance equal and you get her out to sea and out of Panama Bay.

Senator HARRIS. In other words, that the 130 miles difference can be used in getting out to sea from Panama?

Senator HANNA. Yes; that is my idea.

Mr. HAUPT. That is true in part, and yet when the vessel gets 130 to 150 miles out she has not got as good winds or as favorable currents as if she were at Brito, some 300 or 400 miles farther, because all the time that she is being towed she is moving southwardly or away from the line of her traffic and must sail back if northbound. The geographic position is such that it is a detour which ought to be avoided, and this is possible by the other route. I think that covers the question raised by Senator Harris as to the physical conditions with this closing remark, that inasmuch as we are building a canal for all classes of vessels that the factor of using sail ought to be very carefully considered, and in that respect I believe firmly that the Nicaragua Canal is greatly preferable to one at Panama.

ENGINEERING FEATURES.

If it is the desire of the committee, I will take up a few of the engineering features of the project at this point.

The CHAIRMAN. Before you do that, I would like you to state what experience you have had in engineering.

Mr. HAUPT. To make a long story short I will state that my engineering practice began on the Hoosac Tunnel and the Troy and Greenfield Railroad about 1858, where I had considerable practical experience in all classes of engineering and structural work, as well as in estimating, and that after that I went to West Point with practical experience as a basis and completed my training there; graduated in the Corps of Engineers in 1867.

Since then I was stationed on the Great Lake surveys until 1869 and on construction as a United States engineer officer of the fifth military district, which was the State of Texas, when I became interested in harbor problems. After resigning I was engaged as engineer on Fairmont Park, Philadelphia, for some years and in 1872 was appointed professor of civil engineering at the University of Pennsylvania, where I remained for twenty years, giving special attention to the economics of transportation, and subsequently have been engaged in various engineering projects as a consulting engineer. I was also in charge of the geodetic work for the Government in the State of Pennsylvania and president of the Engineers' Club and of the Cauca-Colombia Arbitration, etc.

The CHAIRMAN. You have been on two boards of the Government?

Mr. HAUPT. Yes; I served on two boards since 1896. I have been continuously at work on this question of the interoceanic canal for some years.

Senator HAWLEY. What two boards were they? Were they concerned with this question?

Mr. HAUPT. Yes; the Nicaragua Canal Commission, succeeding the Ludlow Board, and the present Commission, both appointed by our late President.

The CHAIRMAN. Well, proceed with your statement about the engineering features, which you wish to make.

Mr. HAUPT. Considerable stress has been laid on the difficulties of constructing canals on either route by the advocates of the other.

DRAINAGE AND EMBANKMENTS.

The CHAIRMAN. Before you get any further there, there is a difficulty that I have on the geographical question that I would like to have you explain. After the waters have passed over the Gigante Spillway, on the plan of the Isthmian Canal Commission, and have gone down into the Pena Blanca Swamp and another swamp there, do they come back into the Chagres River or do they go off to the sea?

Mr. HAUPT. They then flow into the Chagres River, and thence to the sea.

The CHAIRMAN. They flow back into the Chagres River?

Mr. HAUPT. Yes.

The CHAIRMAN. At what point?

Mr. HAUPT. Just below the Marais de Agua Clara.

The CHAIRMAN. With reference to the Gatun River, at what point do they come in?

Mr. HAUPT. It is just about at Gatun where they approach the old bed of the Chagres.

The CHAIRMAN. Does the Gatun River come from the east or the west?

Mr. HAUPT. It comes on the other, or right bank, the easterly side, and the waters from the spillway come in from the westerly side.

The CHAIRMAN. The Gatun River comes in from the east?

Mr. HAUPT. Yes.

The CHAIRMAN. And these waters that have passed through these swamps and over the spillway come in on the opposite side?

Mr. HAUPT. Yes.

Senator HANNA. That is the westerly slope?

Mr. HAUPT. Yes.

The CHAIRMAN. At about the same point where the Gatun River empties, if I understand you?

Mr. HAUPT. Here is a little model of the Panama route, which will perhaps give a more definite idea of the situation. The topography is not exactly right on this model; it does not conform entirely to the physical conditions in details. Here is the site of the Bohio dam and the Gigante Spillway will be some three miles away, in a foothill, and then it enters into the swamp known as the Pena Blanca, and thence flows on down through an artificial cut and enters the Agua Clara, thence through another cut of over a mile to the valley of Chagres River at a point below that, and thence to sea in a bight of the Bay of Colon, distant from the entrance to the canal.

Senator HANNA. Does the black line on that model represent the canal?

Mr. HAUPT. No; that is the railroad line. You see the groove in there; that represents the canal line.

The CHAIRMAN. The main fact that I wanted to arrive at is this, and that is, that all the water that passes over the spillway at Gigante passes through the swamps and finds its way back into the Chagres River at or about Gatun?

Mr. HAUPT. Yes; just beyond that.

The CHAIRMAN. And into the canal unless it is fenced out?

Mr. HAUPT. It is kept out of the canal by embankment lines, which are designed to prevent it from flooding the canal.

The CHAIRMAN. An embankment line is necessary there to keep the waters of the Chagres from emptying back into the canal?

Mr. HAUPT. Yes.

Senator HANNA. That is provided for in the construction?

Mr. HAUPT. Yes.

The CHAIRMAN. Now, go ahead. I wanted to get that point cleared up.

BOHIO DAM ON PANAMA CANAL.

Mr. HAUPT. The integrity of the entire line depends on the ability to build and maintain a dam in both cases. In the Panama route the site selected by the Commission is known as the Bohio dam site; in the Nicaragua Canal route it is known now as the Conchuda dam site. That is a point about 3 miles above the mouth of the San Carlos River, and is a better site than the one formerly accepted because of its less depth to rock. At the Bohio dam site, referring now to the Panama route, the French technical committee did not bore to rock. They did not extend their borings deeply enough, and they found a stratum of hard clay about 35 feet thick, which they supposed was sufficient to base an earthen dam upon, and limited the extreme height of that dam from the lowest point of its foundation to 93.5 feet as being the maximum safe limit, or 75.5 feet above the river bed.^a

This Commission, however, boring through that clay, found it was underlaid by a stratum of sand and permeable material, and consequently was unreliable for the reason that if that sand outcropped in the basin above it might provide a subterranean flow for the lake and endanger the entire structure, as occurred in the Lebanon reservoir and at other places. Our borings extended to the depth of 128 feet below sea level before finding what is reported to be continuous rock across that gorge, making it necessary, if a dam is built there, to construct a great wall, such as that proposed by the Commission, to make it impermeable to go down 128 feet below sea level, and that necessarily involves the use of the pneumatic process.

Senator HANNA. Could the freezing process be used in that case?

Mr. HAUPT. I think not; it has been used successfully in some of the wells sunk in Louisiana and elsewhere, but I have never heard of it being used to any great depth.

Senator HAWLEY. What is that?

Mr. HAUPT. That is a freezing process; a number of pipes are sunk down in the marshy earth, and chemical substances are used so as to produce cold and freeze the earth around them, and in that way make a solid wall of frozen earth.

Senator HAWLEY. Will it stay frozen?

Mr. HAUPT. I think that is a very doubtful question in that warm country.

Senator HANNA. Did you ever hear of the shaft sunk in the Chapin mine?

Mr. HAUPT. No; I do not now recall it by name.

Senator HANNA. It went a great deal lower than that depth.

^a Vide p. 28, Doc. 188, S., 56th Cong., 1st session.

Senator MITCHELL. You found a stratum of 48 feet of sand below this hard structure?

Mr. HAUPT. Yes; of variable thickness and not stratified, but in pockets. The plan which the Commission proposed for this Bohio dam is one consisting of pneumatic caissons, of which this is a print, showing the positions of the caissons. This shows the site of the dam in the plan.

Senator HARRIS. What is the size of those caissons?

Mr. HAUPT. Thirty feet by one hundred feet.

Senator HAWLEY. What does 30 feet by 100 feet mean?

Mr. HAUPT. Thirty feet in breadth. This other plan which I am now showing you in the plan for the Conchuda dam in the Nicaragua route. It is of the same general character, and embodies the same principle as to the form and application of these caissons.

Senator HANNA. What is the depth in that dam as compared with the other, before you get to——

Mr. HAUPT. This dam is 28 feet below sea level at the site of the dam, where the surface of the river is approximately 50 above, making 78 feet under water, and the surface of the river varies. It would be approximately 78 feet under water, as compared with 128 feet under water. Pneumatic processes have been used to a depth of 110 feet, the greatest depth that I know of, and that was at the east abutment of the St. Louis bridge.

Senator HANNA. In that connection let me ask you if 110 feet is the extreme depth it has been used—if that is the extreme depth it can be used, or could you go any deeper?

Mr. HAUPT. I was just going to bring out that point, Senator. Therefore the Commission feels that it is possible to extend these pneumatic caissons to that greater depth—it is only 18 feet farther. It would simply involve a lesser length of time for the shifts of men in the operations in the caisson and a greater expense.

Senator HAWLEY. Now, you say a great deal about the pneumatic process. What do you mean—the forcible driving of air down to work a drill?

Mr. HAUPT. No, sir; not exactly that; but we mean the operation of men in a chamber—an inclosed chamber. If you were to take a cup or saucer and turn it upside down so as to protect them like a diving bell, and then force air down into that with as much pressure as would suffice to resist the pressure of the column of water above and outside of its base so that it will contain an air space which will be in equilibrium with the pressure of the water outside—in other words, the men must work there under a pressure of between four and five atmospheres for that depth. That makes very rapid organic combustion, and they can not stand that for long periods.

Senator HAWLEY. How did that work at Brooklyn?

Mr. HAUPT. That worked very well at Brooklyn. There they went down 78 feet at the New York pier; but I was about to explain the difference between a bridge pier and a dam built in that way. A bridge pier is usually composed of only one isolated structure placed upon bed rock or other suitable material, whereas in this case there are a series of those structures which must be placed in juxtaposition, and then the space between them outside of this bell or caisson must be filled in and made impermeable. Otherwise the dam will leak at the bottom under the pressure, and that is the serious part of this question.

These caissons are supposed to be placed as nearly contiguous as possible, and then the spaces between them are filled in by “fillers,” or what might be called dowels, set in grooves between the caissons.

the grooves do not come exactly opposite, there is difficulty in getting those spaces closed, and the whole space between the ends of the abutting caissons must be filled thoroughly with concrete or impermeable material, although concrete is not entirely impermeable.

Senator HARRIS. To make it perfectly clear, those caissons are a series of rectangular boxes 30 by 100 feet, placed as nearly side by side as possible, and with the joints between made water-tight, if possible.

Mr. HAUPT. That is a very clear explanation of the whole situation, yes, sir; except that they are set here end to end.

The CHAIRMAN. Of what material are they made?

Mr. HAUPT. The shell is made of iron or steel.

The CHAIRMAN. Cast iron or wrought iron?

Mr. HAUPT. Wrought iron or steel, riveted carefully and tightly luted, so that no air can escape. That is another difficulty, in retaining the air under great pressure; it has to be very carefully put together, so that no air can leak through it.

The CHAIRMAN. It has to be equivalent in its tightness, then, to a steam boiler?

Mr. HAUPT. Yes; quite so. In the drawings shown for the Bohio dam, in studying it critically recently, I noticed the caissons are not shown as going entirely to rock through their whole base, but one edge of them only rests upon the rock and the other edge on sand.

Senator HAWLEY. When you speak of rock do you mean granite?

Mr. HAUPT. It is the kind of rock met at that particular place; the borings show hard rock. I do not remember the character of it. It may be a hard limestone. The caissons must be sunk farther really than the depth to the surface of the rock, because if one edge touches on the edge of a sloping rock that must be excavated and the whole bed be leveled off for the entire length of each of the caissons.

Senator HARRIS. Do you mean to say that the Commission did not provide for an excavation to level bearings of each caisson?

Mr. HAUPT. That is what the drawings show. I was surprised to find it so. In the case of the Panama dam it is not, as it is in this case at Nicaragua, where the caissons are shown as penetrating the line of rock throughout their whole lengths, but at Bohio the print shows that the bottom line is half in rock and half in earth. Of course that would be a failure, and it is probably an oversight on the part of the draftsmen which has escaped the criticism of the committee having it in charge. I presume, however, that the estimates are based upon the sinking of those caissons into the rock and the leveling off of the bed for a bearing.

Senator HARRIS. For excavating it?

Mr. HAUPT. Excavating a level for the bed around the edges and filling in the chamber with concrete, as should be done.

Senator MITCHELL. What is the diameter of each caisson?

Mr. HAUPT. One hundred feet in length along the axis of the dam. The width is 30 feet.

The CHAIRMAN. Thirty feet square?

Mr. HAUPT. Thirty feet by one hundred feet. It is a rectangular box.

The CHAIRMAN. The box stands perpendicularly.

Mr. HAUPT. The height of it is only sufficient to constitute a working chamber, and on the roof of this the core wall is placed, which runs up until it gets within range of safe construction by ordinary methods in open air.

The CHAIRMAN. You mean the box is laid down on the bottom of the stream, and that there it measures 30 feet one way and 100 feet the other?

Mr. HAUPT. Yes; and then it is gradually settled down to rock by excavating the material from within it, as it sinks by the load built upon its top or back.

The CHAIRMAN. It runs up with those same dimensions until it gets out of the water?

Mr. HAUPT. Yes. The thickness of the core wall is retained at 30 feet nearly to the surface, and then it tapers in toward the top as the pressure of water decreases.

The CHAIRMAN. Or until it gets to where it can be worked properly with cofferdams?

Mr. HAUPT. Yes. In regard to this dam the Commission says in its final report, at page 94:

The Bohio dam is the most important structure on the line, being of great magnitude, of vital necessity to the scheme, and offering many difficulties of construction. The Commission has devoted much time to the procurement of full and reliable information concerning the foundation upon which this dam must rest, and to a study of the various types of structures which might be adopted.

It goes on further to say that in the borings they made they all reached rock, with the exception of seven, in which there were accidents in sinking the holes.

They show a variety of materials—hard clay, soft clay, sand, gravel, and some mixtures of sand, clay, and gravel in varying proportions. These materials are found in beds of varying shape and thickness, not distributed with uniformity and not arranged according to any general law, from which can be deduced the character of the soil at points other than those actually examined. In every section constructed from the borings strata of greater or less dimensions are found, which are permeable by water. How far these extend, and whether or not they communicate with the surface of the ground above the site of the dam, are points about which information can not be obtained in advance with certainty.

So that there is an uncertainty as to the physical conditions of the foundation upon which this dam must rest. It is essential that the gorge be absolutely sealed by means of this core wall, which is designed to run down to rock, and that involves the fundamental idea that the foundations shall be so placed upon solid rock as to prevent seepage.

Senator HANNA. Let me ask you right there, when the French engineers located and provided for the construction of that dam, did they stop in their investigations at the clay bed or did they go deeper?

Mr. HAUPT. They stopped at the clay bed; they had not as complete data as they should have had, and that, I think, has characterized all of the French projects from the first. The first concession was gotten without any careful survey.

Senator MITCHELL. Was 80 feet as low as they went at all?

Mr. HAUPT. About that; yes, sir. I have not the figures at hand. In view of that condition of affairs, it follows at once that the site selected for the dam at Conchuda is very much better and involves no element of uncertainty as contrasted with the other dam site, and that was a very important factor in my mind in reaching the conclusion as to the relative merits, from an engineering standpoint, of these two projects.

Senator HARRIS. The entire safety and efficiency of the canal in each case depends on the dam?

Mr. HAUPT. Unquestionably. There is no dam on the western slope in either project, for the reason that the inclosing locks and their retaining walls constitute the retaining wall for the water on the west

side of the summit levels, so that the question of dams there is not involved.

Senator HANNA. That is slack water.

Mr. HAUPT. Yes; for the summit level.

The CHAIRMAN. Now, the question that you just answered of Senator Harris's relates to a plan in which one dam is held to be sufficient on the Nicaragua route and one dam on the Panama route, does it not?

Mr. HAUPT. It does; yes, sir.

Senator HANNA. Is there any way of which you are aware by which more than one dam could be used or relied upon in the Panama route?

Mr. HAUPT. No, sir.

The CHAIRMAN. With dams at intervals?

Mr. HAUPT. No, sir; there is not.

The CHAIRMAN. In the Childs survey and in the Lull survey there were a number of dams across a single river, I believe.

Mr. HAUPT. Yes, sir.

The CHAIRMAN. Is that a practical method of constructing a canal?

Mr. HAUPT. Entirely so. That would reduce the height of the dam and the pressure or head of water and increase somewhat the expense and time of operation.

Senator HARRIS. It would require a greater number of locks?

Mr. HAUPT. Yes; if the lift is reduced.

The CHAIRMAN. If I remember it correctly, there was a dam at each of the rapids?

Mr. HAUPT. A dam at Machuca and one at Castillo, as well as others.

The CHAIRMAN. So that it is in an engineering sense practicable to build a canal on the San Juan River with several dams?

Mr. HAUPT. It is; yes, sir.

The CHAIRMAN. Whereas that is not practicable on the Panama route?

Mr. HAUPT. There was a dam proposed at Gamboa in an earlier plan, but it was found to be impracticable and it was abandoned, and Bohio is believed to be the only safe dam site of that route.

The CHAIRMAN. I am only asking your opinion as an engineer.

LOCKS.

Mr. HAUPT. Yes; another question of importance from the engineering standpoint is that of the harbors.

Senator HARRIS. Just excuse me before you leave the Bohio dam. I wanted to ask your opinion as to the double flight of locks which is, you may say, a part of the retaining of the water that provides for two locks in immediate succession, or a flight of locks, as it is called, with a maximum lift of 45 feet.

Mr. HAUPT. Yes, sir.

Senator HARRIS. And they are also to be double chambered?

Mr. HAUPT. They are.

Senator HARRIS. Is not the feature of a double lock with two lifts of 45 feet each something beyond the engineering experience and an element of very great risk and danger?

Mr. HAUPT. As to the latter part, I could hardly say that I would measure the risk as very great. It is, however, beyond ordinary engineering precedents. The tail gates would have to be over 80 feet high, which involves a larger proportion of metal in their cross section than if they were but 18.5, as on the Nicaragua in some instances and 37 in

others. They are, therefore, heavier than in the mere element of increased height, or, in other words, they would have more than double the weight of a gate only half as high.

Senator HARRIS. The ends would have to be 90 feet, would they not?

Mr. HAUPT. They would have to be more than 80 feet, I should say; yes, sir. I am including the lift and the draft both in the 80 feet, but not the bearing on the miter sill nor the free board at the top. There would have to be a margin to cover that—I should say about 90 feet in all. I mention the amount of metal because that is one of the factors in the cost of maintenance. That will come in later in the way of deterioration, in showing that a larger amount of metal would be required for the higher lifts, although there are fewer locks at Panama than at Nicaragua, and these items would be compensating in a measure.

Senator HANNA. You do not consider there is anything impracticable in the engineering proposition of making those locks?

Mr. HAUPT. No, sir; I believe they can be built, and built that high.

Senator HARRIS. What I meant was that a single lock might be made, but the juxtaposition of two locks would make it a much more difficult piece of work than for a single lock.

Mr. HAUPT. Yes, sir.

Senator HARRIS. More difficult to operate?

Mr. HAUPT. Yes, sir.

Senator HANNA. Why would it be more difficult to operate?

Mr. HAUPT. Because of the greater height and the weight of that metal gate requiring more power to operate it, there would have to be a lift wall there of 35 feet, on which that gate would rest, and the gate would have to rise some 90 feet above that in order to get flotation for the vessels above the sill of that middle wall.

Senator HANNA. Does the fact that it is a twin lock make it any more difficult?

Mr. HAUPT. It is not a twin lock side by side that we are considering, but a flight of locks, or in tandem, so to speak; that is, one immediately succeeding the other, in which the head gate of one is the tail gate of the other.

Senator HARRIS. There is a middle gate, which practically has to extend from the top of the upper lock and clear down to the bottom of the lower.

Senator HANNA. I understand.

Mr. HAUPT. One lock immediately succeeding the other makes it a little more difficult, because of the additional metal to be moved, as already stated.

Senator HANNA. I understand how it is operated exactly. It would be a little more difficult, perhaps, but I am talking about the practicability.

The CHAIRMAN. What is the lift of each of those locks?

Mr. HAUPT. On the Panama locks the lifts are 45 feet each.

The CHAIRMAN. Ninety feet in all?

Mr. HAUPT. Yes; they have to lift the vessel to the 90 feet maximum height of lake level. On the Nicaragua it is 28.5 feet in some locks and in one instance, at No. 4, it is 36½ feet. The highest at Nicaragua, which is Lock No. 1, going in from Greytown, has a lift of 37 feet.

The CHAIRMAN. On the Nicaragua route is there any lock at the exit of the canal line from the river?

Mr. HAUPT. At the lake?

The CHAIRMAN. No, no; at Conchuda Dam or above the Conchuda Dam.

Mr. HAUPT. There is one just below Conchuda Dam coming east.

The CHAIRMAN. How far below?

Mr. HAUPT. I can give it to you more definitely by looking at the profile.

Senator HARRIS. There is a lock right at the end of the lake level and the river level.

Mr. HAUPT. It is about $4\frac{1}{2}$ miles down from the junction of the canal and the river.

The CHAIRMAN. You enter the canal, then, at $4\frac{1}{2}$ miles above this lock from the river?

Mr. HAUPT. Enter the river $4\frac{1}{2}$ miles from the lock.

The CHAIRMAN. What is the height of that lock? That is what I want to get at.

Mr. HAUPT. Thirty-seven feet is the maximum, because of the fluctuation of the lake, and 31 is the minimum of that Lock No. 4. On the east side the others are $18\frac{1}{2}$, except No. 1, which is 36.5 feet.

Senator HARRIS. As I understand it, the first lock is $36\frac{1}{2}$ feet, and then there are two locks of $18\frac{1}{2}$ each, and then there is a lock letting you into the river level of 36 feet. That gives you the total height of the four locks. There are two of $36\frac{1}{2}$ and two of $18\frac{1}{2}$.

Mr. HAUPT. Yes, sir; practically.

Senator HANNA. You would make it four locks to get at that elevation instead of two as on the other route?

Mr. HAUPT. Yes, sir.

Senator HANNA. And as far as the time and cost of those locks, the cost would be greater on the Nicaragua route?

Mr. HAUPT. Yes; because of the increased number of locks. There are five on the Panama route and eight on the Nicaragua route.

The CHAIRMAN. I will ask you how far above the Conchuda dam, on the plan of the Canal Commission, does the canal enter the river?

Mr. HAUPT. I think it is in the neighborhood of three miles above the dam, measured along the river, where the canal enters the river. I have not the plan to locate it specifically.

Senator KITTREDGE. There are eight locks on the Nicaragua route?

Mr. HAUPT. Yes, sir.

Senator HARRIS. Four on each side?

The CHAIRMAN. Three miles above the Conchuda dam the ships would leave the river and enter the canal cut and then proceed about 4 miles before they would reach a lock?

Mr. HAUPT. Yes, sir. The summit level is extended through that portion of the canal.

I shall proceed to describe the harbors, if it is agreeable. Much has been said in regard to the relative advantages and disadvantages of the harbors on the two routes.

The CHAIRMAN. Before you get off this canal I want to ask you a question. In the Culebra cut there is a provision made for a wall. What was the height of that wall on each side of the canal line?

Mr. HAUPT. It is about 40 feet from the bottom to the top of the berm of the wall. It may be a little more than that; it runs to above the surface of the water, and then there is a berm alongside of it for the railroad track and for service. I have not the cross section of the Culebra cut here. Those sections were estimated at a slope 1 on 1, as though it were all earth, although in the cut there is some rock.

The CHAIRMAN. I think there must be a misprint in here about the height of the wall. It is somewhere stated here to be 91 feet above high water.

Mr. HAUPT. Very likely that is a misprint if it states 91 feet.

Senator HARRIS. It probably runs up a little higher out of the water in the canal—higher than the water in the canal—if they want to protect the banks.

The CHAIRMAN. I was speaking about a statement in this report about 91 feet being the height of those walls; that they were nearly vertical on their surfaces. You may go ahead, and I will call your attention to the fact after I find it in the report. There may be a misprint about it.

Senator HANNA. It could not be higher than the canal was deep, except the distance above the waters.

Mr. HAUPT. Just enough to allow for the wave action; that is all that would be required.

HARBORS.

In regard to the harbors: At a hearing which the Commission had with the vice-president of the Panama Railroad on January 16, in reply to an interrogatory from myself, he stated that the La Boca terminal on the Bay of Panama had cost the railroad company \$2,200,000; it has a draft of 26 feet; that vessels enter it at high water and lie in the basin along the pier, which basin is 150 feet wide, and that it costs \$100,000 per annum to maintain it.

Senator HARRIS. Will you pardon me just there a moment? Did you say the vice-president of the Panama Railroad Company or the Panama Canal?

Mr. HAUPT. The Panama Railroad Company.

Senator HANNA. What is his name?

Mr. HAUPT. Edward A. Drake.

Senator HANNA. Has he his office in New York City?

Mr. HAUPT. Yes, sir. The report of the Commission, on page 92, also says that the estimated cost of the Colon entrance and harbor is \$8,057,707.

Senator HANNA. How do you get the maintenance in that estimate?

Mr. HAUPT. That was for "entrance and harbor." I am going to give you the maintenance now. Now, they estimate the maintenance to cost at Colon \$30,000 a year, and to make the comparison more uniform, so as to have a basis, I have capitalized that at 3 per cent, which means \$1,000,000; so that the estimated cost of construction with maintenance capitalized is \$9,057,707 for Colon.

Senator MITCHELL. That means maintenance for one year?

Mr. HAUPT. No, sir; it is capitalized now. On the basis of Mr. Drake's statement, the La Boca terminal facilities have cost \$2,200,000 and \$100,000 a year for maintenance. Capitalizing the latter at 3 per cent, it makes three and one-third millions, making a total of \$5,533,000. The sum of those two items then for construction and maintenance of harbors on the Panama route figures out \$14,591,040.

Senator HANNA. Are you quoting now from the report of the Commission?

Mr. HAUPT. No, sir; this is my estimate, based on the figures of the Commission and of the Panama Railroad Company officials. The Commission has not treated the matter in that way. They have not capitalized the cost of maintenance and made a comparison on that basis. On the Nicaragua route the following are the figures:

Greytown, cost to construct, \$2,198,860. The cost of maintenance is placed at \$100,000 per year. Capitalized at 3 per cent, that means

\$3,300,000 and odd. Parenthetically I would say that that estimated cost of maintenance was a mere expression of opinion, that the Commission did not know whether it would be \$50,000 or \$150,000, and they concluded to make it \$100,000, so that the aggregate of those two items for construction and maintenance is \$5,532,193 for Greytown. For Brito Harbor the cost of construction is estimated at \$1,509,470.

The cost of maintenance is put at \$50,000, which capitalized at 3 per cent represents \$1,666,666, making a total of \$3,176,136. The aggregate for the two terminals on the Nicaragua route is therefore \$8,708,329, or a difference in favor of Nicaragua for harbor and terminal facilities and maintenance of \$5,883,711.

Or if we omit the maintenance items from both routes, as they are largely speculative, and compare merely the cost of creating harbors and entrances of equal facilities under all conditions, there will result for the cost on the Panama line \$10,257,707, as against \$3,707,930 for the Nicaragua route, a difference in favor of Nicaragua of \$6,449,777, and still the cost of completing the Panama cut of 4 miles from La Boca to the 6-fathom curve at sea and of enlarging the maneuvering basin should be added. This would doubtless increase the difference to over \$7,000,000 in favor of the Nicaragua terminals.

Senator HANNA. Are those figures used by the Commission in making their final estimate as to the relative cost?

Mr. HAUPT. Yes, they are; the Commission's estimates of cost, except at Panama, which they did not have, as that was only recently presented.

MAINTENANCE AND OPERATION OF THE CANALS.

Now, as to the cost of the maintenance and operation of the entire route of the canals.

Senator HARRIS. The maintenance or the operation and the maintenance?

Mr. HAUPT. The maintenance and the operation both. A detailed statement was carefully preserved by a subcommittee proposing the following departments:

First, one of supreme control, under which were the departments of engineering, transit, medical, finance, law, and police; and a careful estimate was made based on the probable number of employees and officers required to operate and maintain those several departments. Some of these, being general, involve the same expense, such as the administration in the United States, the governor's office, and the financial department, and the others vary with the local conditions and the length of route.

In the estimate under the engineering department for the Nicaragua route I have been unable to ascertain the figure for the cost of the metal work, so that that is not included in this statement, but it is given under the Panama project where the estimated cost of the maintenance of metal structures, allowing a depreciation of $7\frac{1}{2}$ per cent per annum, amounts to \$259,613. The value of the metal work is estimated at about three and one-half millions on the Panama project. It should be very little more on the Nicaragua Canal for the reasons already given, because of the higher lift of the Panama locks. I have therefore allowed 30 per cent on that, so as to get a basis for comparison, which would make the cost of maintenance of metal work at Nicaragua, with a deterioration of $7\frac{1}{2}$ per cent, \$337,548.

Senator HARRIS. On what route is that?

Mr. HAUPT. The Nicaragua route. And adding that to the differ-

ence in cost of maintenance, based upon the other figures, it would give in the neighborhood of \$900,000 as difference in the cost of maintenance.

Senator HAWLEY. In favor of which?

Mr. HAUPT. In favor of the Panama route, because of its shorter length. I would add, as my individual thought in the matter, that the depreciation for metal work is somewhat too high, for, from my examinations of the condition of ironwork as we found it in Nicaragua, after some six or seven years' exposure, it was almost impossible to detect the slightest deterioration due to weather conditions in that country. I made templets of rails and weighed spikes, and I found they were incrustated with a film of oxidized metal, but that beyond that there was no deterioration.

For wearing parts it would be greater, and to provide for possible accidents or injuries it would increase the percentage somewhat, so that I think \$900,000 would fairly represent the difference in the cost of maintenance and operation of those two routes instead of \$1,300,000 as stated in the report. Now, as I have said before, that would be largely offset by the sea voyage, which the tonnage would have to undergo in order to avail itself of the Panama route, and which I estimate at \$1,000,000, based upon a traffic of 10,000,000 tons, carried in steam vessels of about 10,000 tons register, and an estimated expense of the trip at \$250 per day and supplemented by sail. That amount of tonnage would represent the economy of \$1,000,000 in favor of Nicaragua. But this is merely an opinion, and it is nearly balanced by the estimated cost of maintaining and operating the longer canal.

As the tonnage increases the difference in favor of Nicaragua would be greater, but in my judgment the additional cost of the sea portion of the route can not be omitted from the equation without injustice, since the problem is to determine the total cost of the transportation from port to port. Moreover, the longer towage via Panama Bay for sailing vessels should not be ignored. In short, there could be no practical difference in the cost by either route.

Senator HAWLEY. I would like to ask a question. I understand that the Nicaragua route offers one advantage in permitting the vessels to come into fresh water and thereby permitting them to be relieved of the barnacles and other things on the ships.

Mr. HAUPT. Yes, sir; that is a physical feature which I intended to touch upon—the fact of this large lake as a regulator for floods and also for a large marine terminal and naval station, which would be available. It is true that there is an artificial lake at Bohio, on the Panama route, covering some 40 square miles, but a large portion of that has not the depth of 35 feet. Perhaps less than one-third of it would have that depth, but still it would be available for such purposes if it did not silt up too rapidly.

Senator HAWLEY. There is less docking on the Nicaragua route, is there not? I mean for the docking of vessels and the cleaning of them.

Mr. HAUPT. I think it would be about an even thing.

Senator HANNA. A vessel would not lie in fresh water very long for the sake of getting rid of barnacles?

Mr. HAUPT. Not very long. It would not pay.

The CHAIRMAN. I have found this matter on page 93, which has confused me. I will read from the report of the Commission:

The entire cut will be lined with masonry walls finishing at elevation 92.2 feet above high water, these walls having nearly vertical faces and furnishing benches 38 feet wide on either side of the canal, on one of which the Panama Railroad will be laid, while it is probable that the service track will be placed on the other.

Now, I want to know particularly about those walls.

Mr. HAUPT. I think your confusion, Mr. Chairman, results from the fact that the elevation 92.2 feet means that much above sea level and not that that is the height of the walls; is not that the difficulty?

The CHAIRMAN. Finishing at 92.2 feet above high water?

Mr. HAUPT. Yes; that is sea level, not the water of the canal at all.

Senator HARRIS. It would really be about 3 feet above the water of the canal?

Mr. HAUPT. Yes. This elevation of 92.2 feet above high water does not mean that elevation above the bottom of the canal, but above the sea level.

DRAINAGE OF CULEBRA CUT.

The CHAIRMAN. That is where the confusion came in. Now, Mr. Haupt, if you could say a word as to the feasibility of the drainage of the slope of the cut at Culebra, I would be glad to have my mind a little more clear on that point; that is, for the purpose of preventing the possibility of slipping.

Mr. HAUPT. I think the borings and the excavations that have been made have relieved the minds of the engineers on that point to a large extent and show that the seepage through the earth is practically eliminated, at least during the dry season, and that there is little danger of further slipping. That would be provided for in part by bermes on the slopes, and in addition there should be ditches constructed on the bermes and drains on the slopes to carry off the subsurface waters.

Senator HARRIS. It was those berme ditches I supposed the Commission referred to when they spoke of the drainage to relieve the slipping.

Mr. HAUPT. The danger of slipping would be relieved largely in that way. There would be a berme ditch extending along each of these benches to carry off the water laterally, with diagonal ditches down the slopes to relieve the water and not to let it run directly down and to acquire an injurious velocity in that way.

The CHAIRMAN. Have the walls or ditches been surveyed there by the American or French engineers?

Mr. HAUPT. Yes; that whole country has been thoroughly covered, and this feature is, I believe, provided for in the estimate.

The CHAIRMAN. The drainage and ditches are provided for in the estimates?

Mr. HAUPT. Yes, sir.

The committee then (at 12 o'clock m.) took a recess until 2.30 p. m.

AFTER RECESS.

The committee met at 2.30 p. m.

Present: Senators Morgan (chairman), Mitchell, Harris, Hanna, Kittredge, Hawley, and Foster.

ADDITIONAL STATEMENT OF MR. LEWIS M. HAUPT.

The CHAIRMAN. I suppose, Professor, we are ready to go ahead with you.

PANAMA HARBOR.

Mr. HAUPT. Well, Mr. Chairman and gentlemen of the committee, in continuing on the question of the harbors, I will revert to the harbor at Panama, of which we have a general chart, received since the

session of this morning, showing the whole contour and depth of the bay of Panama, and the distance which a vessel would have to sail in leaving Panama in order to round the peninsula of Azuero. This is in latitude about 7° as compared with 9° .

There are about 2° of latitude there, or about 140 miles in a straight line to the south which one would have to make to get out of the bay. This second chart, No. 1042, will give a better idea, perhaps, of the character of the fore shore at Panama, and shows also the cut made in the sand at La Boca out to the present anchorage or roadstead at Naos Island, very nearly 4 miles long. The depth of water has been dredged there and is indicated to be 26 feet.

Senator HANNA. That is at low tide?

Mr. HAUPT. Yes; but they come in at high water, because of the currents when the tide is running flood or ebb.

The CHAIRMAN. I would like to inquire what is the formation there through which that dredging was done?

Mr. HAUPT. That was largely through sand and coral rock; in fact, all through sand and coral rock. I can not give the relative percentage.

The CHAIRMAN. Do you mean coral rock in place, or coral boulders?

Mr. HAUPT. Coral rock in place. It is as shown on chart 1950, under the site of the city of Panama, which is on a coral reef, and which city was placed there for the purpose of getting out of the range of the enemy's guns after Old Panama was destroyed by the buccaneer Morgan in 1671.

The CHAIRMAN. As a rule, how far does that coral rock extend from the actual coast line out into the bay?

Mr. HAUPT. Along the cut, do you mean?

The CHAIRMAN. Yes; in that vicinity.

Mr. HAUPT. I can only give it to you approximately. It depends upon the depth of the cut. I should say, perhaps, two-thirds of the way.

The CHAIRMAN. You would have to cut through coral rock two-thirds of the way to make an opening for the canal?

Mr. HAUPT. I will refer to the profile for an answer to that question, as that will probably show the borings. I will leave that unanswered and put it in afterwards, if found. Chart No. 1950 shows the same features on a larger scale, and also the tendency of the littoral drift to pass across the mouth of this cut and obstruct it with a depth on this chart of less than 18 feet, low water. There is here a littoral drift—a prevailing drift to the westward.

The CHAIRMAN. What do you mean by a littoral drift?

Mr. HAUPT. I mean a movement of sand or eroded material in that direction, due to waves and current action.

The CHAIRMAN. What causes the drift?

Mr. HAUPT. Waves, currents, and winds, but especially the breakers.

The CHAIRMAN. In the bay?

Mr. HAUPT. Wherever a sea breaks, it disturbs the bottom and churns up the sand—becomes charged with it; and if the waves break at an angle to the shore the sand is propelled in the line of that movement.

The CHAIRMAN. Does that drift cross the channel of the canal?

Mr. HAUPT. Yes, sir.

Senator HARRIS. Does the rise and the fall of the tide there have any effect on that drift?

Mr. HAUPT. Yes; it gives a gradual movement to the whole body

of water, creating currents which are influenced by the submerged topography.

The CHAIRMAN. What danger is that to the canal?

Mr. HAUPT. It means more cost for the maintenance and, I think, has been well covered by the statement made by Mr. Drake, that it is costing them \$100,000 a year to maintain this entrance. I would like to quote on this point, because I think it is of some importance, a statement made to me by a former consul of the United States, a resident at Panama for a number of years. He says:

The canal outlet near Panama was very unwisely selected, as the company will forever have to dredge the silt referred to out of it. A glance at the map will show that the southwest side should have been selected for the canal channel.

In other words, that this canal should have been made so as to come out on the westward side of the islands instead of on the easterly side.

The CHAIRMAN. Would that have avoided the drift?

Mr. HAUPT. That would have avoided it to a large extent and given a shorter cut, and so a less length of channel to maintain. The depths in here are also greater than on the line adopted. For instance, at this point [indicating] the natural depth is 24 feet, whereas at the corresponding distance on the line of the present canal the natural depth is only 6 feet.

The CHAIRMAN. Where is La Boca?

Mr. HAUPT. La Boca is "the mouth," where the pier stands—the present mouth of the canal, where the canal proper meets the coast line.

The CHAIRMAN. Is that the place where the Panama Railroad Company established a depot?

Mr. HAUPT. They have established a terminal; yes, sir. That is the terminal that cost about \$2,200,000, as stated.

The CHAIRMAN. What is it made of?

Mr. HAUPT. It is built on iron caissons sunk into this coral rock, and then an iron frame covered on the top to protect the merchandise, and is a sort of storehouse—a point of transshipment—with automatic cranes, and a railroad track, and all the facilities. It is a place for the rapid transfer of goods.

The CHAIRMAN. That, now, is for the use of the railroad company?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. Built by the railroad company?

Mr. HAUPT. Built by the canal company, but paid for under contract by the railroad company.

The CHAIRMAN. Built by the canal company for the railroad company?

Mr. HAUPT. Yes; and is now a part of the railroad company's property.

The CHAIRMAN. Are you going to make any statement now—I am not conducting the examination for you—in regard to the traffic in the Bay of Panama, how far it is out to the place where the winds prevail?

Mr. HAUPT. Yes; I might as well take that up.

Senator HANNA. He is virtually on that point now. You discussed that this morning.

Mr. HAUPT. Yes, sir; in part only.

Senator HANNA. That is what he is showing the charts for?

Mr. HAUPT. Yes, sir. The distance from La Boca out to deep water (36 feet) is a little over 4 miles. That is the channel which would have to be maintained against this literal drift which crosses it.

Senator HANNA. Is not that the case with the Suez Canal?

Mr. HAUPT. It is, to some extent. They have a drift to the easterly there, in the Mediterranean, from the Delta of the Nile, but the western mole protects the canal from it, whereas here there is no protection whatever.

The CHAIRMAN. There is no coral reef at Port Said, is there?

Mr. HAUPT. No, sir; it is all sand.

The CHAIRMAN. Let me ask you one question about the coral reef. Is the edge of that coral rock along the line of this opening of this canal of sufficient strength and integrity to wreck a vessel if it was driven against it by the wind?

Mr. HAUPT. Yes; at any considerable speed, or even at half speed, it would be very apt to ruin a vessel. Any hard material of that kind would injure a vessel.

The CHAIRMAN. It is rock, not mud?

Mr. HAUPT. Yes; it is rock. You have all seen coral and you know exactly what it is in large lumps.

The CHAIRMAN. Is that calculated to pierce a ship, an iron ship?

Mr. HAUPT. Yes; the surface of it is not smooth.

Senator HANNA. Has there ever been a vessel damaged in the passage, that you know of?

Mr. HAUPT. They have only been using the channel for a short time. I have never heard of an accident of that kind, although the channel was only designed to be 50 meters (164 feet) wide at the bottom; but, as already stated, it is only used at high water, when the depth is about 20 feet greater. So it is not always safe nor available.

Senator HANNA. There is no wind there that would blow a vessel out of her course?

Mr. HAUPT. At times there are winds, but they are variable and light.

Senator HANNA. I thought that the trouble was that there were no winds.

Mr. HAUPT. It is in the region of the "doldrums" or equatorial calms, but at certain seasons of the year there are these local storms. The tonnage passing from the railroad has reached a maximum of about 380,000 a year, and that was during the days of the active construction of the canal, before the suspension.

The average tonnage under normal conditions was in the neighborhood of 250,000 tons a year. That was carried by vessels at either port, and the latest report of the Panama Railroad Company which I have as bearing on that subject shows that during the year 1900 there were no sailing vessels entered the port of Panama whatever; that the total tonnage of the steam vessels entering in that year was 327,842 tons, but whether gross, net register, or dead weight cargo tons is not stated.

Senator HANNA. Is it not a fact that a large sailing vessel could not afford to break bulk in her passage from San Francisco to any other port? She could not afford to break bulk to go from San Francisco and then have to ship by the railroad. The advantage of having a large cargo ship is that it can go a long voyage without transshipment.

Mr. HAUPT. That is true. That is the position that I take exactly, that it does not pay to transship. But yet I have talked with many men eminent in the railroad business, and they claim that the railroad can handle that business better and cheaper. I think that is answered by the fact that there is a railroad at Tehuantepec, and it

has never secured very much of that transshipment business; but I think you are entirely right in regard to that. If we had a canal, it would be useless to break bulk; but this statement that I have quoted merely goes to show that the sailing vessels in Panama Bay have ceased entirely. No sailing vessels during the last year entered or cleared.

The CHAIRMAN. What is the date of that report you speak of?

Mr. HAUPT. It is under date of December 31, 1900. It is the fifty-first annual report of the Panama Railroad Company.

The CHAIRMAN. Were those reports furnished to the Commission?

COLON HARBOR.

Mr. HAUPT. Yes; I have a full set of them.

The conditions at Colon Harbor entrance are shown by this chart, No. 1008, which I have asked for merely to explain why it is that the estimate for the entrance to the canal at Colon and the harbor is so high as to exceed \$8,000,000. From this chart it appears that the 36-foot contour does not enter Colon Bay at all, although there is a large bight in the shore line. It is not a harbor for deep-draft vessels, especially during the time that northers or the northeasters prevail; vessels then have to run to sea. So that it involves the construction of a broad channel from the 6-fathom curve to the harbor behind the mole.

Senator HANNA. Is that in the figures of the Commission?

Mr. HAUPT. Yes. Here is the 5-fathom contour, which, you see, scarcely enters the bay at all. The 6-fathom contour would be somewhere away out here [indicating].

Senator HARRIS. Where is what is alluded to in that report as the jetty?

Mr. HAUPT. This is the jetty or mole which will protect the entrance proper. After a vessel has passed this jetty it must turn to the right on a reverse curve of only 3,280 feet radius to enter the harbor proper. This curve is sharper than any on the Nicaragua route. In my opinion a better entrance could be obtained by the construction of a break-water offshore, as at San Pedro, but it would be more expensive.

The CHAIRMAN. The Commission speaks of a certain amount to be expended outside of the jetty.

Mr. HAUPT. Yes, sir.

Senator HARRIS. That is for the mole?

Mr. HAUPT. No; but for the entrance.

The CHAIRMAN. Before you leave Colon and the harbor, I saw on the map to-day, lying here on the table, what appeared to be a drift across the mouth of the canal at Panama.

Mr. HAUPT. I have spoken of that, Senator; perhaps you did not hear me at the time. This is it: A 17-foot spit. It cuts across the dredged channel.

The CHAIRMAN. Was that produced by the causes that you have adverted to—the drift of the ocean?

Mr. HAUPT. It evidently is, judging from its form and position.

The CHAIRMAN. It would require a wall or jetty to keep that out.

Mr. HAUPT. There ought to be something of that kind on the easterly side to protect the channel, or it may be cheaper to do it by dredging; but that means the maintenance of a dredging plant for that purpose.

GREYTOWN HARBOR.

In regard to the harbor at Greytown, the Commission has estimated for two jetties; but, as stated in the report, that may not be necessary, possibly, but in order to include every contingency it was figured on. The statement made in the report of the Commission, however, is that one jetty has already shown its ability to impound the littoral drift there for a considerable distance. That was a jetty only 1,000 feet long, built by the Maritime Canal Company, and it did have the effect of so arresting that movement as to cause the natural currents to adhere to the entrance and erode a dry sand bar to the depth of 7 feet. That was augmented by the dredge, and with that short spur, which did not intercept the entire littoral movement, it would be possible to maintain a channel to a considerably greater depth by dredging.

I made a critical study and estimate of that while at Greytown, having ample time to spare, and I found that a jetty 3,300 feet long built out to the 7-fathom curve would impound all the littoral drift for a period of twenty-nine years, taking the average rate of advance from the various surveys, extending over a period of seventy-five years; while taking another rate of advance for a different epoch (290 feet annually), it would have held the drift for twenty-four years, so that one single jetty placed on the easterly side of the proposed entrance would actually impound the sand and protect the entrance from its encroachment and keep it clear after it is once dredged open for a period of twenty-four years, with little cost except for the maintenance of the jetty itself.

Senator HANNA. Would not the San Juan River have some influence on that?

Mr. HAUPT. Very little, for the reason that the principal discharge of the San Juan is now through the Colorado mouth, which is 22 miles to the southward, and for the further reason that the interior lagoon receives a very small percentage of silt, which comes down through the Caño Animas branch of San Juan proper, and it would be all landlocked and deposited inside, so that there would be very little littoral drift from this source, while at the Harbor Head lagoon there is one branch of the river which debouches into it and carries some silt out to the salient, where it is caught up and taken to the westward.

The amount of silt so removed is now carried past this proposed entrance to the canal, and it is impounded in the reentrant angle on the Rio Indio shore, which has been advancing at the rate of 46 feet per annum. There are successive terraces in front of the old warehouse of the canal company and in front of the railroad, so that it is now out 1,000 feet from the position it had when they first built there. There are also wrecks stranded a considerable distance inside of the coast line, showing that the shore is building out.

In other words, the shore is straightening, instead of having a deep bight, as it had before, and that is all due to the diminution and transposition of this sand. So that this estimate of two millions and over for the improvement of the harbor at Greytown is ample, because it provides for two jetties, and I think one will do the work, and do it well. I believe that it is one of the simplest harbor problems to be found anywhere, because of the prevailing direction of the well-known forces acting upon it, so that it may be dismissed without any fear of not getting a good land-locked harbor at a moderate cost.

The CHAIRMAN. Do you know the length of the breakwaters at Port Said?

Mr. HAUPT. I can not give it to you from memory exactly just now.

The CHAIRMAN. Out to 35 or 36 feet of water, is it not about three times the distance that it is at Greytown?

Mr. HAUPT. Yes; more. I was going to say roughly 3 miles.* It may not be so far as that. It is quite an extensive work.

The CHAIRMAN. Do you know whether back of that breakwater in the direction of the Nile it is filled up with drifted silt?

Mr. HAUPT. Yes; it is considerably.

The CHAIRMAN. So that Port Said Harbor would have been impossible but for that breakwater?

Mr. HAUPT. Yes, sir.

Senator HARRIS. Are you going to take up the harbor at Brito?

BRITO HARBOR.

Mr. HAUPT. The harbor at Brito is a very much simpler case, because of the headland which juts out into the ocean, making a landlocked and protected beach, with the exception of winds from the south and southeast. That beach has very little travel of drift on it, and as the winds are nearly all offshore there is a minimum of sand movement, so that the Commission does not anticipate any trouble whatever from littoral drift creating a bar, and only one short spur is provided for to cooperate with the headland to maintain that entrance.

The CHAIRMAN. What is the cost of that—the estimate for maintenance?

Mr. HAUPT. That is \$30,000 for any dredging that might result from deposits of sand blown in and in order to show that the subject of maintenance was not overlooked.

The CHAIRMAN. It may or may not be necessary?

Mr. HAUPT. It may not cost over \$10,000 a year to maintain it, but the Commission thought it safe to say about \$30,000.

Senator HANNA. All these expenses for maintenance are estimates?

Mr. HAUPT. They are so called, but they are scarcely estimates; they are hardly worthy of that designation, for they are really opinions—simply approximations.

The CHAIRMAN. You could call them guesses.

Mr. HAUPT. Yes, sir. That is the same with regard to Greytown as any of the others. I think, however, that the Greytown question has been so thoroughly discussed by Professor Mitchell, formerly, and by the recent commissions that we know pretty nearly what to expect. The amount of drift has been from 750,000 to 600,000 cubic yards per annum, and on that basis I have figured on this breakwater to arrest it and retain it.

SANITARY FEATURES.

Now, if it will please the committee, I will take up the question of relative sanitary conditions.

The CHAIRMAN. I want to get a better description and a better account of the country lying between Bohio Dam and Gatun down

* Vernon-Harcourt gives the length of the western breakwater in 1885 as 9,800 feet and of the eastern as 6,233, making the total length a little more than 3 miles.

the river. About what distance is it on a direct line between Bohio and Gatun?

Mr. HAUPT. In the neighborhood of 5 miles, I think. I will look on my map and see.

The CHAIRMAN. What kind of a country is it on either side of the river between Gatun and Bohio? Is it precipitous or flat?

Mr. HAUPT. It is flat and marshy, and with hills. That is the characteristic of the whole country. The topography is very much broken.

The CHAIRMAN. Does the tide come in as far up as Bohio?

Mr. HAUPT. Yes, sir. It affects the Chagres to that point, but it is slight.

The CHAIRMAN. How high does it rise there?

Mr. HAUPT. The tide on that side of the Isthmus may be in the neighborhood of a foot or less. The normal tide on the coast is 1 foot, but as it comes in there may be some slight compression of the tides, as there is usually in estuaries and rivers. It will be modified by the stage of the river, winds, marshes, and other local features. I have never measured it.

The CHAIRMAN. The line of the canal as projected by the Isthmian Commission between Bohio and Gatun. Does it keep along with the line of the Chagres River?

Mr. HAUPT. Very closely; it crosses it in a number of places. It crosses it at Pena Blanca, and crosses it at Palo Horqueta, and then again at Gatun.

The CHAIRMAN. What is Gatun?

Mr. HAUPT. It is a little village a short distance up from Colon and beyond what is known as Monkey Hill.

The CHAIRMAN. Does a river come in there from the eastward at Gatun?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. What is it called?

Mr. HAUPT. I suppose it is the Gatun. It is the confluent of the Gatuncillo and the Rio Quebranca.

The CHAIRMAN. That river enters on the right bank of the Chagres River as you come toward Colon.

Mr. HAUPT. That is correct.

The CHAIRMAN. What sort of a stream is that?

Mr. HAUPT. A stream flowing through a flat, marshy country.

The CHAIRMAN. All the way?

Mr. HAUPT. Pretty much all the way. The headwaters rise in a ridge along the Caribbean Sea.

The CHAIRMAN. Is it a large or a small stream?

Mr. HAUPT. Not a very large stream; it has a comparatively small drainage area.

The CHAIRMAN. Now, on the Isthmian Commission canal line, also on the French line, is the Gatun River diverted from the canal?

Mr. HAUPT. The canal, you might say more properly, is diverted from that river. The entrance of the canal is thrown over a little and the Chagres River is diverged at that point so as to keep the whole of the Chagres drainage on the left bank of the canal, while the Gatun is kept on the right bank and diverted over into the swamps near Colon.

The CHAIRMAN. The engineering proposition is to keep both the Chagres and the Gatun rivers out of the canal.

Mr. HAUPT. Separated from the canal by embankments; yes, sir.

The CHAIRMAN. Now, commencing at Bohio and going on the left bank, what is necessary to divert the Chagres River from the canal?

Mr. HAUPT. It would be necessary to construct an embankment across the northerly end of the swamp Pena Blanca, thence to extend it to the northwesterly along the line of the canal across the swamp Agua Clara, and along the left bank of the canal to a point beyond Gatun about $5\frac{1}{2}$ miles.

The CHAIRMAN. Would that require an embankment?

Mr. HAUPT. Yes; through a swampy country.

The CHAIRMAN. What dimensions?

Mr. HAUPT. I believe our dimensions were 15 feet wide at the top and side slope of one on three.

The CHAIRMAN. How wide at the bottom?

Mr. HAUPT. I have not the data for that, as it will depend on the elevation of the crest of the embankment.

The CHAIRMAN. How high would it be?

Mr. HAUPT. It would have to be high enough to keep out the flood. At one time the floods are said to have covered that country to the depth of 42 to 43 feet in a single night. That flood is reported by the Panama Railroad Company. I think that was in 1879.

The CHAIRMAN. Now, that bank that you would construct on the left bank of the Chagres River, from Bohio down opposite Gatun, so as to free the canal from the water of the Chagres, and for which you would have to have an embankment, would the water that passes through this spillway at Gigante and through the Pena Blanca swamp come back into this swampy country you have mentioned and be required to be fenced out from the canal in order to preserve the integrity of the channel of the canal?

Mr. HAUPT. Yes; it would.

The CHAIRMAN. So that you would there have the whole course of the Chagres River which passes through the Pena Blanca Swamp and over the spillway at Gigante to contend with, and it must be fenced off?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. For a distance of about 5 miles?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. Where is the earth to come from to build that?

Mr. HAUPT. Well, there is a great deal of earth in that country, and I suppose it would be burrowed from adjacent hills.

The CHAIRMAN. About how far away? That is what I want to know—earth that is fit for those purposes.

Mr. HAUPT. A haul of a mile or so would supply enough from those hills near the Marias Bruja.

The CHAIRMAN. You would have to put in railroad tracks to haul it?

Mr. HAUPT. That would be the best way.

The CHAIRMAN. You could not haul it out in carts.

Mr. HAUPT. No; not if economy is considered.

The CHAIRMAN. Below the point that you speak of and where you cut through the hills, nearly or about opposite to Gatun, how far would the Chagres waters have to be fenced off from the canal below that cut in the hills?

Mr. HAUPT. Do you ask for the length of that cut?

The CHAIRMAN. Yes, sir.

Mr. HAUPT. About a mile and a quarter.

The CHAIRMAN. So that on one side of the canal there would be an embankment to cut off the waters of the Chagres and on the other

side an embankment to fence off the waters of the Gatun, as I understand you.

Mr. HAUPT. I did not quite catch your meaning in the first place. I thought you meant for the diversion of the Chagres on the right bank. The embankment would have to be in the neighborhood of 2 miles in order to cut off the waters of the Gatun River.

The CHAIRMAN. Now, all that area there had to be fenced off by embankments?

Mr. HAUPT. Yes; so as to preserve the integrity of the canal from their floods. Perhaps I had better insert the language of the Commission's report as to the plans for controlling this drainage and protection question.

On page 98, under "Levees," the report reads:

The canal in the low region above and below Gatun must be protected from overflow by levees, their total length aggregating about 5.4 miles. The height to which these levees should be carried can not be determined with accuracy from the present data, and must be fixed from observations of floods hereafter. As in all other cases of doubt, a height has been adopted which will err, if at all, upon the safe side. For the purpose of estimate the height has been placed at elevation 25. The width on top is 13 feet and the side slopes 1 on 2. It is probable, however, that the levees will be used as spoil banks for the material dredged from the canal, and their dimensions, except as to height, will much exceed those here given.

On page 97 also it is stated that "the present surface of the Agua Clara Swamp is at elevation 11.5."

From these extracts it would appear that the embankment would be 13.5 feet in height at this locality; but if, as reported, the flood of 1879 rose to a height of 42 feet, measuring from sea level, it would have overtopped the 25-foot levees by 17 feet and inundated the canal and harbor. If the country is to wait for future floods to determine the dimensions of the canal embankments, commerce may well despair of ever attaining this great economy.

The CHAIRMAN. Would the earth or substance or soil borrowed from the canal be sufficient for such embankments as would fence out such a flood?

Mr. HAUPT. No, it would not; but that has all been covered in the estimate of the Commission, which has provided for such embankments as are described in the report, but which in my opinion are wholly inadequate.

The CHAIRMAN. How far below Gatun would the canal extend before it diverged toward Colon?

Mr. HAUPT. Only about three-quarters of a mile. There is quite a curve at Gatun, and it begins to swing around at Gatun.

The CHAIRMAN. Then you leave the Chagres River entirely and go toward Colon?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. From that turn into Colon is it necessary to embank that canal?

Mr. HAUPT. That embankment would have to be extended down apparently until it meets the Sierra Mindi, on the peninsula which separates the valley of the Chagres from the bay of Limon. That would close it entirely.

The CHAIRMAN. How far would that be?

Mr. HAUPT. In addition to the $5\frac{1}{2}$ miles it would take about a mile more.

The CHAIRMAN. So that it would be about $6\frac{1}{2}$ miles on that side?

Mr. HAUPT. Yes; I should say so.

Senator KITTREDGE. In speaking of the right and left banks of the Chagres River and the canal, in which direction are you going?

Mr. HAUPT. We always say the right bank in the direction of the flow. The right bank is the right side, taking the stream as it flows.

Senator KITTREDGE. And going toward Colon it is eastward?

Mr. HAUPT. Yes; northeastward.

The CHAIRMAN. I don't know whether Senator Harris wants to ask you anything further about the Bohio Dam before you go on to the question of the sanitary condition of the two regions. Do you wish to, Senator?

Senator HARRIS. No, sir; I do not know as it is necessary.

The CHAIRMAN. I want to ask you about one point.

Mr. HAUPT. Before you go into that, as long as we have touched on the dams, let me add, if you please, one point as to the head of water of the two dams. I think it is an important matter, as it affects the probable amount of percolation or seepage through the bottom of the dam. The effective head at Panama may be as much as 90 feet of water, while at Nicaragua it is limited to about 60 feet, depending upon the height of water below the level of the dam, making a difference in favor of Nicaragua as to seepage of about 50 per cent.

The CHAIRMAN. In constructing a rock dam, or a dam with a core in it—what do you call that kind of a dam?

Mr. HAUPT. An earth dam with a masonry core.

The CHAIRMAN. Would it be necessary in the length of time that it would require, some eight years, I believe it is, to have a temporary dam to fence off the waters of the Chagres?

Mr. HAUPT. Oh, yes.

The CHAIRMAN. Would it be indispensable?

Mr. HAUPT. It would be indispensable, and that is provided for by first constructing a waterway and then throwing a temporary dam across the valley of the Chagres and diverting the river.

The CHAIRMAN. In these estimates of cost is there any estimate for a temporary dam?

Mr. HAUPT. Yes. It certainly should be.

The CHAIRMAN. What is it?

Mr. HAUPT. I can not give you the detailed figures on that; for it is not contained in this report, because this does not contain any details, but that was no doubt figured out. I don't remember now, but it would probably be between \$500,000 and \$1,000,000, speaking roughly, it varying with the site, depth, character, and other conditions.

Senator HARRIS. Mr. Morison, in that article of his which has recently appeared, I think, states that no estimate was made for a temporary dam, and he adds what he thinks will be the cost of a temporary dam to the figures given by the Commission.

Mr. HAUPT. I believe he does make that statement, Senator Harris. I think you are correct about that; but I want to say in justification of what I have just said that he was a member of that committee with Colonel Ernst and Mr. Burr, and the rest of the Commission did not see all the details of their estimates. I took it for granted, therefore, that all those matters, and especially as they are indispensable, had been provided for and not overlooked. I remember that the statement is made by him, however, as you say. Perhaps he may be mistaken.

Senator HARRIS. He adds nearly two millions to the estimate of the cost for the temporary dam?

Mr. HAUPT. Yes, sir.

Senator HARRIS. And from his article I infer that there was no question in the mind of the Commission as to the fact that this permeable material did connect with the water of the Chagres.

Mr. HAUPT. Yes, sir.

Senator HARRIS. Because he speaks of that being proven by driving down a pipe, and that the water would rise immediately in the pipe to the height of the water in the river.

Mr. HAUPT. Yes; there is that risk and danger, and I am very much afraid of it.

Senator HANNA. Let me ask you there, is there any sediment or silt in the Chagres River that would tend to fill up that Bohio dam?

Mr. HAUPT. Yes, there is quite a large amount of that. As it comes down from mountains exceeding a mile in height, and with considerable velocity in the upper reaches of the river, there is considerable sediment.

Senator HANNA. What are the banks of the river?

Mr. HAUPT. Alluvial with few exceptions, with outcroppings of rock, just as we find them on all of our rivers flowing through alluvial basins, and there is considerable sediment carried down which would be impounded on this Bohio dam.

The CHAIRMAN. Does not the railroad company get its ballast from the washings of that river?

Mr. HAUPT. Yes; they have a temporary construction track down there in the bed of the river, and it supplies its requirements for ballast on the east side from that source.

Senator KITTREDGE. How far from the location of the Bohio dam?

Mr. HAUPT. That is above the location, I think; I am not sure as to the location of that.

The CHAIRMAN. That gravel bank is up at Obispo, is it not?

Mr. HAUPT. I was just looking to see if I could recognize it on the map from the relative position of the railroad and the river. It appears from this map that it is between Obispo and San Pablo. That is above the site of the dam and below where the river makes its sharp turn to the northeasterly.

Senator HARRIS. The fact that that is permeable material and has connection with the waters of the Chagres, and that the waters of the Chagres are to be raised to a head of 90 feet makes it a very serious proposition.

Mr. HAUPT. Yes; it does unless there is that stone wall, supposed to be impermeable and running down into bed rock.

Senator HARRIS. That is, the caissons have to be sunk so as to have an absolutely water-tight connection between them.

Mr. HAUPT. Yes, sir.

Senator HARRIS. The walls sunk so deep as to prevent the water from going under them.

Mr. HAUPT. Yes; certainly; but they are not so shown on the drawings.

The CHAIRMAN. Those are questions that I wanted information about before you go to this next topic that you propose to address your remarks to.

CULEBRA CUT.

Senator KITTREDGE. As to the difficulties incident to the construction of the Bohio dam, are there any serious engineering difficulties in the construction of the Panama line?

Mr. HAUPT. The question of time is involved in that. We do not believe that there is any real physical difficulty in making that cut now at Culebra, although it does involve the removal of 43,000,000 yards of earth and other materials, some rock, but the New Panama Canal Company has been handling that at the average rate, in five years, of 1,000,000 yards a year, and unless that speed is very greatly increased and the capacity of their plant augmented it is going to take much longer than our figures show. We figure on the neighborhood of 5,000,000 yards a year.

Senator KITTREDGE. I inquire of the purely engineering question.

Mr. HAUPT. As to the locks, there is this unusual lift of 45 feet, and that is the only important engineering question other than those I have mentioned, and that is not considered to be a doubtful one. It is possible to build and operate locks of that lift.

Senator MITCHELL. Do you know the extent and force of machinery employed by the canal company?

Mr. HAUPT. Yes; they had when we were there about 3,000 men employed, but I can not give you offhand the number of cars and engines nor the miles of track, etc., but you have seen the illustrations of the work in their reports, showing how they have taken out the material in benches and they have distributed it on the spoil banks.

Senator MITCHELL. From your knowledge of the whole situation, how much increase, if any, in the operating force could be made there?

Mr. HAUPT. There would have to be a capacity of five times the present force and plant at least in order to do the work of taking that cut out in eight years.

Senator MITCHELL. I understand that, but how much force could be increased there and worked to an advantage.

Mr. HAUPT. The Commission has expressed itself in this wise on that point: "That the study of that question has not been as yet carefully worked out, but it would require to be thoroughly systematized before any work should be let on that."

Senator HARRIS. That material all had to be taken out of the ends of the cut; there is no other way of reaching the spoil banks.

Mr. HAUPT. They can work from both ends and on both sides. By working in benches you can put a large force in there, just as you would drive a tunnel, by first driving the heading, then the bench on one side, followed by that on the other, then the bottoming, and finally the trimming and lining. You could distribute your force so as to not interfere seriously with each other.

Senator HARRIS. There is a limit, of course, to the number of men that can be worked.

Mr. HAUPT. You can only attack it in a certain number of points. The fact that it is so concentrated is an objection and a difficulty which has weight in giving the preference to the Nicaragua route, where there is a larger volume, but more generally distributed. The maximum excavation at any one point in the Nicaragua route is 18,000,000 yards as compared with 43,000,000 yards in the Culebra cut.

Senator HANNA. In your judgment, can that cut be completed in eight years?

Mr. HAUPT. I think it would be a difficult thing to do it. It would require complete organization and exemption from epidemics and various things of that kind, which are contingencies and on which no man can make definite predictions, as no one can foresee them.

Senator HARRIS. In working in benches one above the other—I am doing a work on a much smaller scale with the same process—a slip or a slide in one of the benches practically retards the work on the whole slope.

Mr. HAUPT. Certainly; it might, if serious, everything below that and perhaps above.

Senator HARRIS. That is one of the serious results of an accident at any point.

Mr. HAUPT. The average haul also is longer in this case than it would be in the other, and that at a great disadvantage. Everything must be moved longitudinally from the Culebra cut out to the dumping grounds at the ends; whereas on the divide cut, at Nicaragua, it is simply a lateral movement, just as it was in the Chicago drainage canal. It is only necessary to put in a force and conveyors and run the material off on the berms and dump it, making the average haul very much less in that case than in this, and that would reduce the cost of movement and the efficiency of the working plant.

Senator HARRIS. The most serious cuts to be encountered, in fact the only ones of very considerable magnitude, on the Nicaragua line are east of the lake at the Tamborcito ridge.

Mr. HAUPT. Yes, sir.

Senator HARRIS. That is a rock cut of very considerable depth, but only 3,000 feet from end to end.

Mr. HAUPT. The Tamborcito cut is a very narrow one, running up to over 200 feet in height, and, as you say, it is 3,000 feet at the base and largely rock, which would be used for riprap or paving, for protecting the canal, and that is the deepest cut of any on the line.

NAVIGATION OF THE CANAL.

The CHAIRMAN. Well, you are about to proceed now to say something about the health of the two regions.

Mr. HAUPT. I would incidentally like to make one remark to meet an objection that is made to navigation in canals. That is as to the difficulty of steering and handling vessels in them, and it is urged that the Manchester Canal requires two tugs, one fore and one aft, in order to get the vessels through; but I think the fact is overlooked that the Manchester Canal has a very much shorter radius of curvatures than either of these projects. The minimum radius at Runcorn is 1,980 feet, say 2,000 feet, while the minimum radius on the Nicaragua project is 4,045 feet.

There are only four such curves on this route, and they are compensated for by enlargements at those curves so as to give a vessel what is supposed to be the same advantage in rounding them as in the other parts of the canal, and in the whole of the river bottom the channel is made 250 feet wide as compared with 120 feet at Manchester. Those are of course physical facts, which ought not be lost sight of in the availability of the waterway and ability to navigate a canal. It is designed to afford safe and ample facilities. At Panama the least radius of curvature is 3,281 feet, but it is 500 feet wide.

Senator HARRIS. You say the Manchester Canal has curves of a radius less than 2,000 feet?

Mr. HAUPT. Yes; at Runcorn, that is the minimum.

Senator HARRIS. I did not know that.

SANITARY.

Mr. HAUPT. I do not feel that it is necessary to take up much of the time of this committee in going into details into the sanitary condition of the two routes, but those of us that have been there know something from experience about it, and there is abundance of testimony, written, documentary, and oral, as to that. I had a letter from a party who was entirely unknown to me, living at Springfield, Mass., when I was on the first Commission.

I was going to Panama, and this gentleman wrote to me that I must be careful of my health. He went on to state that in the early fifties he had contracted to take four hundred laborers down there on a railroad contract and that he was there for only four months; that only sixteen of them lived to come back, and of those sixteen ten died on the way home, so that the four hundred was reduced to ten men before he landed. M. Brunau-Varilla has also written something on that subject, and as he is also a well-known advocate of the Panama line and has spoken freely in this country, I think what he has to say will be of interest.

Senator HANNA. Is he an engineer?

Mr. HAUPT. Yes; and an earnest advocate of the Panama interests, which is perfectly natural.

Senator HANNA. Is he an engineer of repute and ability?

Mr. HAUPT. I do not know of any of his works. He has written a book called Panama, Past, Present, and Future, published in 1892. On pages 57, 58, and 59 he makes a number of remarks in regard to the climate, and with your permission I will present them briefly. He says:

The climate is deadly. The short dry periods brought about by the trade winds after heavy rains cause the waters to stagnate in the depths of the virgin forests, and the atmosphere becomes impregnated with deadly germs, that no cutting of trees will ever remove before the uncertain and remote time when cultivation takes the place of the forest and uncovers the centers of infection hidden to-day under impenetrable brush.

The dreaded yellow fever strikes the newcomers sooner and harder than the others. Under those circumstances one can not be surprised at the extraordinary death rate among the unacclimated, who, with all their changed habits, have to live and work in a sort of continual Turkish bath.

Out of one hundred men arrived on the isthmus I do not think it rash to say that on the average only twenty were able to remain at their posts, and many out of that number had lost the best of their intellectual value, although they had kept the physical health that was strictly necessary.

The only thing to do in the light of this experience is to select by trial, and that is what the Panama Company had to do.

If one considers the time that is necessary to secure in this way a valuable man, able to help in the success of the work, even in a moderate capacity: if one thinks of the expense occasioned by the fruitless efforts made in this way, one will understand the nature of the task which the Panama Company undertook.

The CHAIRMAN. When was that written?

Mr. HAUPT. In 1892. He goes on further in that strain in his book. Now, as part of our own experience, I would say that we had no serious sickness in the Nicaragua service, and we had a large number of men—several hundred—there for some years; while at Panama the chief of engineers was stricken with yellow fever, but fortunately survived, and most of our men dreaded to work in that country.

Senator HANNA. You say there have been 3,000 men at work under the auspices of the new canal company?

Mr. HAUPT. Yes, sir.

Senator HANNA. Do you know anything about the percentage of mortality there?

Mr. HAUPT. I have no statistics on that. Those men were some of them natives and some of them Jamaicans and other imported laborers. They seemed to stand the climatic conditions better than the Chinese. I think the present conditions are improved, but we feel that the Nicaraguans are themselves fine types of men, able-bodied, and seem to have no serious sickness from climatic conditions, as the trade winds there keep the temperature lower and other conditions are more favorable than at Panama.

EARTHQUAKES.

As to the question of seismic disturbances, I would only add that it has been shown by students of seismology that the presence of active volcanoes act as a safety valve for internal disturbances; and the number of craters along through Nicaragua and Costa Rica being quite large, it affords a vent for any internal stress of the earth, and therefore there are fewer injurious earthquakes in that section of the world than at Panama or elsewhere; and I was very much surprised, in studying that subject, to find that the percentage of earthquakes was lower in Nicaragua than in almost any other portion of the world. Now, we have had some earthquakes in this country recently—one in St. Louis and one in Oregon and many in California—so that, so far as that goes, it shows that there need be little anticipation of trouble from that source.

Senator HARRIS. You say that your investigation shows that Nicaragua is the freest from earthquakes of any country in the world?

Mr. HAUPT. Yes; from serious earthquake trouble; but they have had some earthquakes there. Panama was badly shaken in 1858 and again in 1882, when Colon was rent with a seam across the town. The iron railroad bridge at Barbacoas was shifted out of position. So that the Commission has put those on a parity and dismissed the subject, with the belief that the canal works being buried in the earth would not be seriously interfered with by earthquakes in either case. I think, Mr. Chairman, that that probably covers most of the points.

The CHAIRMAN. Notwithstanding your opinions expressed here to-day, and the facts stated by you, you signed the recommendation of this Commission in favor of the Panama route, if I understand it?

Mr. HAUPT. Yes; I did.

The CHAIRMAN. Did you make any protest about it?

Mr. HAUPT. I wished my position to be thoroughly understood by my colleagues, as well as by those of my countrymen who are interested in this great question, and in the proper performance of my duty, so that I did enter a protest on that subject, a copy of which I believe I have amongst my papers.

I find here a copy of the statement that I filed. If the committee desires to go into that, I will say that in view of the offer made by the New Panama Canal Company, and the assurance that they could give a clear title, which seems to have all the necessary verification, the Commission felt that \$70,000,000 was a very large saving, and that if we could get that canal for their price, \$40,000,000, with all of their property rights, etc., clear of incumbrances, that it would be worth accepting. My view, however, was based on the economy and the physical advantages which were inherent to the Nicaragua Canal.

I felt that the question of cost did not materially affect it one way or the other; that we could afford to pay a very much larger sum for the purpose of constructing a canal which would meet the ultimate requirements of the commerce of the world, and hence I voted against the first proposition to prepare a report in favor of the Panama Canal, and my colleagues voted in favor of it. Then I undertook to state my position in this way at a later time in our sessions, that "Notwithstanding the approximate parity in the cost, resulting from the offer of the New Panama Canal Company, I am of the opinion that the more northerly location possesses inherent advantages as set forth in the previous report of this Commission, which gives the preeminence to the Nicaragua route, and I must therefore respectfully dissent from the conclusions as stated in this report;" but that was voted down with the same majority as before.

In view of the argument that in case there was a divided report signed and sent in by the Commission it might be made use of for the purpose of defeating any legislation, which had great weight with me; fearing the possibility of that, realizing the great necessity of a waterway across the Isthmus, whether by Panama or Nicaragua, and feeling that it was a choice between a canal and the old Cape Horn route, with its enormous expense and risks to commerce, I finally voted, as a matter of good policy, perhaps, to have a unanimous report, and consented to sign the report as submitted. I filed with it a statement to be entered on the minutes by the secretary of the Commission. It is as follows:

He [Professor Haupt] still believed that the Nicaragua route was the better of the two, but that the scope of the investigation had expanded beyond the mere question as to which route had the superior advantages, in view of the political situation and the great probability, if not certainty, of a divided report being used by the opponents of any canal to defeat legislation. It was a question, therefore, of Panama or nothing, and, as he believed firmly in the necessity of an isthmian waterway for the general good, he had concluded that his duty to his country would be best fulfilled by waiving his objections and signing the report, with the understanding that this statement of his reasons be entered upon the minutes.

The CHAIRMAN. As I understand your protest, it amounts to this, that so far as you were concerned you intended to devolve the question of deciding the routes upon Congress?

Mr. HAUPT. Yes. And it was my opinion that the physical as well as the economical advantages of Nicaragua were so superior and so far superior as to justify the selection of that route irrespective of the cost of concessions and the difficulties of getting rights and treaties.

The CHAIRMAN. Now, the falling away from \$109,000,000 to \$40,000,000 as the price that the French put upon their property, I suppose, was the real inducement to this report.

Mr. HAUPT. I imagine so, so far as I can determine. There was nothing else, certainly, as a basis for it, so far as I can learn.

The CHAIRMAN. On that I want to get some explanation. On page 101 it is stated:

Using the same classification of materials and the same unit prices as in the other estimate, with the 20 per cent added for contingencies, the value of the work done is found to be:

Canal excavation. \$21,020,386.

That means, I suppose, that the value of the work done by the French company, as it stood at the date of your report, was \$21,020,386. Am I correct about that?

Mr. HAUPT. Yes; that is what it means, I take it.

The CHAIRMAN. And so in regard to the Chagres diversion, \$178,186?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. And so in regard to the Gatun diversion, \$1,396,456?

Mr. HAUPT. Yes.

The CHAIRMAN. And so in the case of the railroad diversion (4 miles), \$300,000?

Mr. HAUPT. Yes.

The CHAIRMAN. Now, as to the railroad diversion; I suppose that means for the purpose of constructing the canal, getting it out of the way?

Mr. HAUPT. Getting it out of the way. It was in the path of the canal.

The CHAIRMAN. Well, when you get through with the canal and get it completed and in running condition, that railroad would not be of much service, would it, commercially speaking?

Mr. HAUPT. Only for local business. Its earning capacity would be practically destroyed.

The CHAIRMAN. Please turn to that report that you had of the Panama Railroad Company and state what the local business was on that railroad in the year of that report, which is 1900, I believe.

Mr. HAUPT. I see that this notices the presence of yellow fever among the troops along the line there. They give a comparative statement here of the local and the through freight transported from Panama to Colon in 1900 and a local from Colon to Panama and from Panama to Colon in 1900.

The CHAIRMAN. You had better get the gross earnings. I should think that would be the safest way to get at it.

Mr. HAUPT. The local tonnage amounts to about 46,000 tons in round numbers. This does not seem to separate the local from the through freight receipts in money values; it simply gives the freight from Panama to Colon and from Colon to Panama, by months, and the total I suppose from those sources. The total receipts from freight or all classes in both directions is \$1,100,000 in round numbers.

It does not separate the local from the through freight in that case. The relation of the two can possibly be better ascertained from the table of tonnage that I have just stated. From this the tonnage of the through freight both ways is 132,000 tons, and the tonnage of the local freight is 46,000 tons, as compared with 132,000 tons. That is then the ratio of the through to the local in 1900—3 to 1.

The CHAIRMAN. The earnings of the railroad if confined to local business would drop down very materially?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. Scarcely more, I believe, according to my estimate of those figures, than is necessary for the maintenance of tracks.

Mr. HAUPT. It is a question whether it would be sufficient to maintain and operate the road. There would probably not be any profit at all on it.

The CHAIRMAN. So that that diversion would be \$300,000 added really to the cost of the canal?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. Then, those being the figures, summing up \$22,895,028, for the value of the work which is there now, why was a contingency of 20 per cent added?

Mr. HAUPT. Merely because this is physical work, and no one can

figure exactly as to conditions that may exist at the time the work is being done, so that it is customary in all engineering work of that class to add something to cover that contingency.

The CHAIRMAN. You add 20 per cent then upon the proposition that if the United States had to do that work they must add 20 per cent to it for contingency.

Mr. HAUPT. Yes; exactly.

The CHAIRMAN. Not that the work is worth really more than that, if I understand you, as it stands to-day, in money?

Mr. HAUPT. The question was to determine what it would cost the United States to put itself in that position.

Senator HARRIS. Excuse me a moment. Was not really the question that that work was of that value to the United States in constructing a canal?

Mr. HAUPT. Yes. If the United States had to do this work which is now in place, it would probably cost the United States this much, and therefore we were willing to place that value upon it as a quid pro quo.

The CHAIRMAN. That is, you were willing to pay the amount of the estimate; but as you come to figure, as you say, in figuring the estimated cost of the work itself, it is always customary to add a percentage for contingency?

Mr. HAUPT. Yes, sir.

Senator HARRIS. But when you figure on the estimated value of a certain piece of work in the construction of any other work, don't you think the chances are that you would rather deduct a percentage; that is to say, that the work would not save you so much money as estimated?

Mr. HAUPT. I hardly see how that question would arise in this matter, for the reason that this involved the removal of certain physical obstructions which would have been in place but for the work done by the Panama people, which we would have had to do in order to put it in the present condition, and it is not really based on the original full-sized section of the canal or any of those supposed conditions, but upon the present condition with all the silting up.

Senator HARRIS. If you were estimating on the cost of this work to the French company, undoubtedly it would be proper, according to my information, to add a percentage, but if I were taking it over and going to use it in another work, I should be inclined to scale it down.

Mr. HAUPT. Naturally; that is the usual method of proceeding in buying a thing.

Senator HARRIS. Well, that is the usual way that contingencies are. It may not prove so valuable to us as the estimated cost of the work to the other party.

Mr. HAUPT. That is, of course, the commercial aspect of the case. We were looking at it, as we supposed, from a purely disinterested point of view, for the purpose of ascertaining how much it would probably cost to produce that result.

The CHAIRMAN. If you were taking what it would actually cost to produce that work, you would add \$250,000,000 to it. That is what it cost the French.

Mr. HAUPT. But it has silted up.

The CHAIRMAN. You foot it up on page 101 of the report as the whole value of the work done there, with 20 per cent added to it, the

sum of \$27,474,033. Turning over to page 103, the Commission says:

Summing up the foregoing items, the total value of the property is found to be:

Excavation already done.....	\$27,474,033
Panama Railroad stock, at par.....	6,850,000
Maps, drawings, and records.....	2,000,000
Total.....	36,324,033

To which add 10 per cent to cover omissions, making the total valuation of the Panama Canal \$40,000,000.

Now, that is putting nearly \$4,000,000 that you add in that 10 per cent. I believe now that you have already added 20 per cent on the excavation already done. Why do you add 10 per cent to that in this last estimate.

Mr. HAUPT. Speaking for myself, I would not do it if I were making up an estimate in this way, and I have always been opposed to adding percentages on percentages, as giving incorrect ideas and inflated values. I would rather, if you will permit me, refer this matter to the Panama Canal committee, which made up this estimate. I can not answer the question, because I really do not know, excepting that it may have been done to cover any probability of omissions that they knew nothing about so as to make a perfectly ample and fair estimate of the value of its property.

The CHAIRMAN. So that if you found it proper or customary to add 20 per cent, so as to make the sum of \$27,474,033, you would not add 10 per cent to that upon the same items, so as to make it represent 30 per cent?

Mr. HAUPT. No; I would not.

The CHAIRMAN. About this matter of \$2,000,000 for maps, do you comprehend what that is based on?

Mr. HAUPT. I suppose very largely upon the data which the French company have as to everything that they have done, the collecting of the data for the purpose of making these maps, the computations, and the engravings, a very large amount of excellent material which they have prepared and of which this map before you is a good illustration.

The CHAIRMAN. In making the new plan for the canal by the Isthmian Canal Commission you have submitted to us what the cost is?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. Of course that must be done upon the basis of accurate surveys.

Mr. HAUPT. Yes, sir.

The CHAIRMAN. And I suppose you have adopted the French surveys.

Mr. HAUPT. To a large extent. They were first checked carefully by our party in the field,

The CHAIRMAN. But you have got enough out of those surveys by visiting Paris to enable you to make this plan of a canal and estimate the cost of it.

Mr. HAUPT. Yes, sir.

The CHAIRMAN. That being so, and having acquired all of this material through the labors that we have paid for in paying for the Commission, \$1,000,000, why is it that the country is called upon to pay \$2,000,000 for those maps?

Mr. HAUPT. I presume—and this is only my own impression—that the Commission did not feel like accepting all this information as a

gratuity and that that was the basis of the allowance of a charge of an item for this valuable data which the French people have collated.

The CHAIRMAN. Has not the Panama Company very expressly invited the Government, through a letter to the President, to go and make all of these investigations and said that they would throw open their maps.

Mr. HAUPT. Yes, sir.

The CHAIRMAN. You went there, then, by invitation?

Mr. HAUPT. Yes.

The CHAIRMAN. Did you put them to any extraordinary expense in getting up this?

Mr. HAUPT. Not any very great expense. They were at some expense, of course, in entertaining the Commission and taking their time and the time of their engineers and conducting the Commission about and showing us everything that they had, but that would not amount to a very large sum.

The CHAIRMAN. It would not amount to \$2,000,000, would it?

Mr. HAUPT. Nothing like it. But we had the benefit of all these years of exploitation, ever since 1879.

The CHAIRMAN. If your Commission could work as you have for a year and a half, for \$1,000,000, I suppose they could place their courtesy at something less than \$2,000,000?

Mr. HAUPT. Yes; and it ought to be realized that these maps are prepared in a much more elaborate form than is necessary for the letting of the work.

The CHAIRMAN. Take the maps of this Commission made on the Nicaragua route. You located a canal actually, I believe, and in every respect, locks and everything?

Mr. HAUPT. Yes, sir. It was, however, merely a modification of the previous locations.

The CHAIRMAN. Could a board of engineers take those maps and go to work there and feel safe in working out a canal according to your plan on those maps?

Mr. HAUPT. They could, with additional borings.

The CHAIRMAN. That being so, can they not take the same maps upon which your Commission made the estimates here and work out the plan of the Panama Canal?

Mr. HAUPT. Yes; there would have to be some additional borings in both cases in all probability for more details in the foundation of the proposed dam site.

The CHAIRMAN. But we would have to pay for that.

Mr. HAUPT. Yes, sir.

The CHAIRMAN. You could not take the borings that the French made of it, because they do not find any rock at Bohio?

Mr. HAUPT. No, sir.

The CHAIRMAN. And you would not undertake to take all their plans and levels?

Mr. HAUPT. No, sir.

The CHAIRMAN. For some of them have silted up and nearly filled the maritime section of the canal in places?

Mr. HAUPT. Yes, sir.

The CHAIRMAN. How far, I will ask you, just as you pass along, is that canal silted up? About what proportion of it exists?

Mr. HAUPT. At both ends it is silted up. I can not tell you what percentage at any given depth it would amount to. But the maritime sections at both ends are badly silted up, so that when we went over

it in a rowboat on the easterly side on the Chagres River I was warned by the men rowing to keep out in the stream or I would strike the bottom of the canal after passing out of the Chagres River. In other words, there is a bar from the diverted current. On the west side, in a tug drawing, I suppose, about 4 feet of water, we were stranded for some little time until we were hauled off.

The CHAIRMAN. Was that within the coast or outside?

Mr. HAUPT. That was within the coast, in the maritime section.

The CHAIRMAN. Now, why was this silting up? Why did it take place?

Mr. HAUPT. Well, it took place because of the slack water or the lee formed by the cut which was made at the side of the bank of the river. The current passing along the edge of the cut would run off as over a wier, carrying sediment into the cut and depositing it there.

The CHAIRMAN. The country must have been furnished with a pretty great abundance of silt to fill up that canal in that way.

Mr. HAUPT. I do not wish it to be understood that the whole canal was filled up so that we could not get a rowboat through. It was only locally.

The CHAIRMAN. I have no further questions to ask.

Senator FOSTER. I believe I will ask you this question; I read from Mr. Morison on the construction of the Bohio dams, in which he says:

It involves novel and untried features, and few engineers, even among those who feel that they can construct it, would be ready to say in advance how the work could be done. The difficulties, taken in connection with the climate and other surroundings, are enormous.

Do you share that opinion?

Mr. HAUPT. I indorse that opinion; yes, sir; and have objected to that project for those reasons, but Professor Burr has had considerable experience in deep foundation, and he assures us positively that it can be done successfully, and I deferred to his perhaps better judgment in the matter. I still feel, however, that there is a very great doubt in regard to that dam.

Senator FOSTER. Are there any such unknown or uncertain elements entering into the construction of the Nicaragua route?

Mr. HAUPT. No; there are not.

Senator HARRIS. There really is no point along the entire Nicaragua route, no question which is not well within the limitation of ordinary, you may say, engineering experience.

Mr. HAUPT. That is correct; yes, sir. There are three possible dam sites, any of which would be better than that one on the Nicaragua route. Each dam site is better than that. The San Carlos dam site is better, and so is that at Ochoa; so is the present Conchuda, and it is possible by further boring that we may find a still better site.

QUANTITY AND CHARACTER OF MATERIAL.

I think there is one point that ought to be touched upon, and that is the total volume of material to be removed from these two projects. According to the figures of this report, the Panama project may require in the neighborhood of 100,000,000 cubic yards to be taken out.

The CHAIRMAN. Does that include the opening of the channel of the canal that is silted up?

Mr. HAUPT. I believe it does.

Senator HARRIS. The total amount to be excavated.

The CHAIRMAN. Very good.

Mr. HAUPT. The Nicaragua Canal project aggregates 230,000,000 cubic yards in round numbers, but of that 130,000,000 cubic yards is dredging work, and I think that is a very important matter, being a large percentage—nearly 60 per cent, I suppose it is.

Senator HARRIS. Fifty-seven per cent.

Mr. HAUPT. Fifty-seven per cent of dredging, the cheapest grade of work, and that can be done in any kind of weather by machinery; so that when we come to compare the two projects we have for the balance of work in earth and rock 100,000,000 yards in Nicaragua, as compared with the same amount in Panama, to be excavated. But as it can be opened in a larger number of places, it being more distributed at Nicaragua and having a much shorter average haul, I believe that our unit prices are very much too high for a fair and reasonable estimate. I say this without criticism of the Commission, because I have always contended that the best measure of the cost of work to be done is the price paid for that which has been done, even by hand labor, in the Tropics.

Senator HARRIS. That would inure to the benefit of the Nicaragua route?

Mr. HAUPT. Yes.

The CHAIRMAN. How do those two places compare as to residences and the filling of the country with population?

Mr. HAUPT. There is very much more chance for that and for industrial development on the Nicaragua line than on the Panama, with a large basin like Lake Nicaragua, and it is quite salubrious in climate and capable of cultivation for coffee, bananas, sugar, cacao, oranges, pineapples, cattle, etc. There is a large sugar plantation at San Francisco, near the gulf of Fonseca.

The CHAIRMAN. Cacao?

Mr. HAUPT. Yes; and chocolate and rubber. These could all be developed, and it would give stability and value to the Governments of those Republics, which they greatly need.

Senator HARRIS. Reverting to the question of values, which were estimated by the Commission as to the Panama property, it occurs to me that the valuation of the railroad there is somewhat excessive. In the report of the Nicaraguan Commission you estimate the cost of a double track at \$50,000 per mile.

Mr. HAUPT. I think it was \$75,000.

Senator HARRIS. No; in Nicaragua.

Mr. HAUPT. Oh, yes; in our first report.

Senator HARRIS. Fifty thousand dollars for a double track?

Mr. HAUPT. Yes.

Senator HARRIS. In the last report you estimate a hundred miles of single track road at \$75,000 a mile, and in this valuation of the Panama road it is really about \$140,000 a mile. Now, for the purpose of construction, the building of the canal (that is all we want a railroad for), would not one of the other estimates be ample allowance?

Mr. HAUPT. In my opinion a contractor's railroad could be built there for \$30,000 a mile for the most of the way, and it need not extend beyond Conchuda.

Senator HARRIS. That class of equipment is the cheapest form?

Mr. HAUPT. Yes; and it is not ballasted nor "surfaced" carefully.

Senator HARRIS. So that in allowing them \$140,000 a mile for a railroad whose occupation will be practically gone when the canal is constructed, I think it is rather excessive.

Mr. HAUPT. Yes, sir.

The CHAIRMAN. How is the navigation from Greytown around to the mouth of the Colorado and up as far as Conchuda?

Mr. HAUPT. By the river?

The CHAIRMAN. Yes.

Mr. HAUPT. It is very difficult, indeed, at low stages of the water in summer; it is hard to get those light-draft boats which are built like those on the Mississippi and the Ohio up the river. They are stern-wheel steamers, so that the Silico railroad was built for that purpose in order to get the freight across to a point in the San Juan near the head of the Colorado branch, to take it up in deeper portions of the river. The bar at the mouth of the Colorado is from 3 to 5 feet in depth and is a dangerous bar, and the Colorado itself is very tortuous, full of islands and rapids which make navigation difficult.

The CHAIRMAN. So you would not regard that as a transportation facility in the building of the canal?

Mr. HAUPT. Not to any considerable extent, but I think that the railroad which is now under construction from Monkey Point to Greytown, being built by the Nicaraguan Government, will expedite the construction of a harbor at Greytown. Monkey Point is a point of rock about 40 miles north.

The CHAIRMAN. That lies to the north of Greytown?

Mr. HAUPT. Yes, sir; and with that railroad constructed a jetty could be built from the shore out and open an entrance into Greytown lagoon, to which vessels drawing 15 to 16 feet of water could be admitted readily, and that would expedite the construction of the railroad plant and the early inauguration of the canal work. Dredges could be started almost immediately.

The CHAIRMAN. Who is building that road?

Mr. HAUPT. The Nicaraguan Government is now building it.

In conclusion, Mr. Chairman, permit me to add that British economists estimate the earnings of the world's commerce to be \$1,200,000,000, and if the isthmia canal will save but one-fifth of the time and distance, it would represent about \$250,000,000 annually. So that while this question is held in abeyance, awaiting a decision as to routes and policy, the commerce is subjected to this enormous and useless waste which would suffice to build the canal each year.

The committee then (at 3.40 o'clock p. m.) took a recess until Tuesday, February 11, at 10.30 o'clock a. m.

ISTHMIAN CANAL.

WASHINGTON, D. C.,
Tuesday, February 11, 1902.

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Mitchell, and Foster of Louisiana.

Also, Senators Pritchard and Kittredge, members of the Committee.

ADDITIONAL STATEMENT OF LEWIS M. HAUPT.

The CHAIRMAN. Mr. Haupt said he had omitted a matter from his statement, and I told him he might have the opportunity of adding to it to-day. I will ask you, Mr. Haupt, if you have prepared the figures?

Mr. HAUPT. Yes; it will take me about two minutes to make my statement. The point I wanted to suggest yesterday was the relation existing between the steam and sail coastwise commerce of the United States—a difficult matter upon which to get any reliable statistics, because the coastwise traffic is not usually recorded; but from the Maritime Exchange of Philadelphia I have a statement of the number of vessels arriving at and departing from that port in the coastwise trade from 1890 up to 1901, giving the steam and sail; and that shows that, for the year 1890, 57 per cent of the arrivals and departures, by number, not by tonnage, was in sailing vessels.

The CHAIRMAN. Was that coastwise entirely?

Mr. HAUPT. Yes; 57 per cent of all the coastwise traffic in the port of Philadelphia was carried in sail vessels. In the year 1895 it was 66 per cent of sailing vessels, and in the year 1901, this last year, it was 67 per cent, showing an increase of the number of sailing vessels used in the coastwise commerce; and that increase is largely due, perhaps, to the introduction of barges, which are being towed, and which are classed as sail vessels. That, Mr. Chairman, is the only statement I wish to make on this subject.

The CHAIRMAN. On this subcommittee of the Isthmian Canal Commission, of which you were a member, were you put in charge of these commercial questions?

Mr. HAUPT. No, sir; I was merely a member of that committee, of which Professor Johnson was chairman. He was put on the Commission for that express purpose.

The CHAIRMAN. You were a member of the subcommittee on that subject?

Mr. HAUPT. Yes; on the subject of economics.

The CHAIRMAN. And consequently you have made a study of this?

Mr. HAUPT. Yes.

Senator KITTREDGE. I should like to ask you a few questions. What part of the work did you do in connection with the Commission?

Mr. HAUPT. My work embraced a careful analysis of economic statistics; that is to say, the relations of the various kinds of tons used in

commercial movements, of which there are some five different standards, to reduce those to a unit and a basis of comparison. There is the gross register ton, the net register ton, the British and American shipping ton, the dead-weight cargo, all of which are measurement tons, and the ordinary tons by weight, "long" and "short." A part of my work was an investigation of the amount of tonnage available from the different transportation zones to and from the Isthmian Canal; the relation of the canals and waterways to the railroads of this country, especially the amount of transcontinental tonnage carried by the railroads, which I have not developed in my hearing at all (this tonnage carried by railroads is a very small amount of the total, not exceeding 2,000,000 tons per year on all the roads of the United States, out of an aggregate movement of some 800,000,000); the value of the tonnage of different classes, such as agricultural products, forestry products, manufactures, merchandise, etc.; the margin which exists between those values, or the purchasing price and the cost of production; to determine what is available for transportation, and to ascertain why it is that the transcontinental railroads are not handling a larger through business, and many other questions of that character; but without detaining the committee by going further into detail, I will submit a statement covering the scope of my investigations.

Senator KITTREDGE. Matters of the character which you have mentioned were considered by the subcommittee of which you were a member?

Mr. HAUPT. Yes, sir.

Senator KITTREDGE. Who were the other members of that committee?

Mr. HAUPT. The other members were Senator Pasco and Professor Johnson.

Senator KITTREDGE. Had you specially in your charge matters of an engineering nature on this work?

Mr. HAUPT. No, sir; the matter of engineering simply came in in a general way before the entire commission as a committee of the whole in studying all the projects presented by the various subcommittees on "Nicaragua," "Panama," and "Other Routes," of which there were three committees.

Senator KITTREDGE. And the testimony you have given upon the subject of engineering, its difficulties, and so forth, is based upon information given you by engineers, members of the committee who had those matters specially in charge?

Mr. HAUPT. Yes.

Senator KITTREDGE. How much time, if any, did you spend upon the Nicaragua route, in going over the line?

Mr. HAUPT. Altogether we were there in the country about four months.

Senator KITTREDGE. I am speaking of you personally.

Mr. HAUPT. Yes; that was on the first Commission. I did not go down with the second Commission, as my work was exclusively economic work at that time, and I having been over the ground before, there was no necessity in my wasting time in going over it again, because there was nothing new to see, so that my time was devoted to this work while the Commission was absent.

Senator KITTREDGE. Here in Washington?

Mr. HAUPT. Yes.

Senator KITTREDGE. And you did work on the ground in connection with the first Commission?

Mr. HAUPT. Yes; I went over every foot of it.

Senator KITTREDGE. Did you go over the Panama route?

Mr. HAUPT. Yes.

Senator KITTREDGE. When was that?

Mr. HAUPT. That was with the Walker Commission in 1898, in the month of March.

Senator KITTREDGE. How much time did you spend there?

Mr. HAUPT. We were on the Isthmus about a week at that time, having every facility furnished us by the superintendent of the Panama Railroad, Col. J. R. Shaler, and we traversed the line from point to point, each day, examining all the critical features as to their engineering difficulties.

Senator KITTREDGE. And with the exception of the week that you spent there, you have gained your information and you base your opinion upon the reports, the data, and statements of the engineers who had that matter in charge?

Mr. HAUPT. Yes; and that, I think, is ample, for the reason that the drawings will show much more than can be seen on the ground in the way of borings, sections, profiles, and cross sections, and estimates. Those are the data which an engineer has to secure as the basis of his judgment. My attention has been devoted to these matters, almost exclusively, for a period of about five years.

BRIEF OF SOME OF THE TITLES PREPARED BY PROFESSOR HAUPT ON ECONOMICS OF THE ISTHMIAN CANALS, FOR THE COMMISSION OF 1899-1902.

PHYSICAL.

1. The Earth's Elements; Distribution of Land and Water; Relation of Coast to Area, etc.
2. Distribution of Population and Languages as a Basis of Trade
3. Curves to determine future Population of the United States and Great Britain, based upon past conditions of growth.
4. Physics of the Isthmus of Panama and its Bay as affecting Transit.
5. Routes of Sailing and Steam Vessels, compiled from various authorities. (Polyconic projection of the Western Hemisphere and Oceans.)
6. Strategic Map of Coaling Stations and Fortifications. (Mercator projection.)
7. Tables of Distances between Ports.
8. Distribution of Earthquakes and probable Effect on Canals.
9. Sanitary Conditions on the Isthmus, and in Central America.
10. Transportation Divides of the World and Zones of Influence.

COMMERCIAL.

11. Commercial Productivity of the Continents. (Europe, 79 per cent; North America, 9 per cent.)
12. Transportation Facilities on the Great Lakes in Developing Tonnage.
13. Evolution of the Steamship as a Freight Carrier.
14. Annual Traffic on the Panama Railroad and its Limitations.
15. Balance Sheet of the Panama Railroad and Distribution of Tonnage.
16. Digest of the Annual Reports of the Panama Railroad.
17. Rates of Tariff Charged for Ocean Freights.
18. Compilation of Estimates of Tonnage Tributary to the Isthmus.
19. Future Tonnage Due to Normal Increment of Growth, and the Determination of that Increment, for Foreign Commerce.
20. New Tonnage Due to Increased Facilities.

ECONOMICS.

21. Relation of Water to Rail Transportation.
22. Relation of Sail to Steam and relative Carrying Capacity.
23. Speed and Dimensions of Vessels.
24. Value of Vessels and their Cost of Operation and Maintenance.
25. Units of Comparison. Relations between Net and Gross Register, Dead-Weight Cargo, American and British Shipping, Overland Freight, and Potential Tons,
26. Average Value of the Commercial Ton by Bulk and by Weight.

27. Analysis of the Classification and Value of Freights Carried by Water and by Rail.
28. Average Prices of Various Classes of Commodities Carried on the New York State Canals for the past sixty years (with diagrams).
29. Relative Rates by Land and Sea.
30. Competitive Overland Tonnage as Affected by a Canal.
31. Prices of Commodities at Points of Production and Consumption.
32. "Margins" as Determining the Market Range of Products Depending upon Kind of Transportation.
33. Graphical Diagrams and Tables Showing Growth of Traffic at Suez and at the Sault Ste. Marie and other Canals.
34. Growth of Railroad Mileage and Tonnage of the United States.
35. Itinerary of the *Oregon* showing possible Economy by a Canal.

MISCELLANEOUS.

36. Translation of "Panama, Past, Present, and Future," by P. Bunau-Varilla. (Supplement.)
37. Chronological Table of Principal Events Affecting Commerce in the last Four Centuries (including Legislation).
38. Commercial Strategy.
39. History and Physical Features of the Suez Canal.
40. Unit Prices.
41. Estimates, Plans, and Engineering Possibilities Studied in Connection with Both Routes for the Purpose of Comparison.

STATEMENT

OF

GEO. S. MORISON

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C.,
Wednesday, February 12, 1902.

The subcommittee met at 10.30 a. m.

Present: Senators Morgan (chairman) and Hanna.

Also, Senators Platt, of New York, Hawley, Harris, Millard, and Kittredge, members of the committee.

Mr. George S. Morison appeared and was duly sworn by the chairman.

STATEMENT OF MR. GEORGE S. MORISON.

The CHAIRMAN. Mr. Morison, Senator Harris is our engineer member of our committee, who is somewhat familiar with that Peninsular country, having surveyed it when he was a young man, in connection with his father, who is an engineer, and so I will ask him to conduct the examination so far as you are concerned.

Senator HARRIS. Mr. Morison, you are a member of the Isthmian Canal Commission?

Mr. MORISON. Yes.

Senator HARRIS. I do not remember whether you were the member of the Commission who made some special examinations as to the route down on the Isthmus of Darien or not. I think you were.

Mr. MORISON. I was. I went along the whole coast from what is commonly known as Panama to the mouth of the Atrato.

Senator HARRIS. The Isthmus of Darien proper is that portion lying below Panama, between that and the mainland?

Mr. MORISON. I have never been able to determine what the Isthmus of Darien was. When I was a boy the whole Isthmus was called Darien. In our classification we called the routes east of Panama the Darien routes.

Senator HARRIS. I wanted to ask you some questions in regard to those routes east of Panama, through the shortest portions of the Isthmus and ending in Caledonia Bay, the Gulf of Panama, San Miguel Bay, etc., those all involving a tunnel.

Mr. MORISON. Yes; everything we could find there would involve a tunnel. The lines across from Caledonia Bay are the ones which have generally been called the Darien routes. The line across from San Blas has been known generally as the San Blas route.

Senator HARRIS. But they are both on that route?

Mr. MORISON. They are a considerable distance apart. This little bit of a map will perhaps show you the location. That little map which I produce shows in a condensed form where those routes are. You will notice that all of them terminate on the Gulf of Panama, and that practically they are all the same distance from the common point that has to be made to get around the Azuero Peninsula.

Senator HARRIS. Of course all of those routes come under the concession which the Panama company has?

Mr. MORISON. Yes; they all come within the territory in which the Panama Canal Company has an exclusive right to build a canal.

Senator HARRIS. And therefore all of those routes would require the same legal and diplomatic negotiations to be gone through with that are involved in the case of the Panama line proper?

Mr. MORISON. I should say so.

Senator HARRIS. I believe you mentioned three of those routes in the report; the Sassardi location, the Aglaseniqua location, and the Caledonia location.

Mr. MORISON. Those are three variants, you may say, of the Caledonia route, or what was generally called the Darien route. They cross the summit of the range, which is very near the coast, at the heads of different valleys. They all come together at or before the connection with the Savana River, which is the Pacific outlet.

Senator HARRIS. You also have a fourth one, the San Blas.

Mr. MORISON. That is the San Blas route.

Senator HARRIS. Now, in all of these practically there are good harbors?

Mr. MORISON. Yes; they are all good harbors.

Senator HARRIS. And of course the distance is shorter between tide levels than by any other route?

Mr. MORISON. The distance on the San Blas route is shorter. The distance on the Darien route proper, that leading from Caledonia Bay, is quite as great as it is on the Panama route.

Senator HARRIS. You estimate, I see, on the Sassardi location for 40 miles of railroad. You give the distance from Caledonia Bay to the mouth of the Lara, varying from 32 miles by the Sassardi route to 36 by the Caledonia route.

Mr. MORISON. Yes. That does not take you to deep water. You have got to improve the Savana River and put in a tide lock at a considerable distance below that. That must be included in the distance between deep waters, and that makes it more than the Panama route.

Senator HARRIS. By the San Blas route the distance from tide water to tide water is 21 miles.

Mr. MORISON. Yes; from tide water to tide water, but not from navigable water to navigable water.

Senator HARRIS. That is what I meant in the other case. It does not mean from the six-fathom line, or anything of that kind.

Mr. MORISON. No, sir.

Senator HARRIS. These have advantages in the way of being sea-level canals and having available harbors?

Mr. MORISON. Yes.

Senator HARRIS. But on account of the one vital piece of work, impracticable apparently, according to the ideas of the Commission—that is, the tunnel—they were not recommended?

Mr. MORISON. That was so. We considered that the objection to a tunnel was so great that it outweighed all of those matters very much.

Senator HARRIS. So that a route may have the advantage of shortness, and yet there may be a vital piece of work which will render it unavailable?

Mr. MORISON. That is true.

Senator HARRIS. In regard to those tunnels, I think you estimate the cost of excavation in the tunnels at \$5 per cubic yard?

Mr. MORISON. Yes.

Senator HARRIS. Do you think it is possible that that can be done at a lower rate than \$5 per cubic yard?

Mr. MORISON. Yes; I do.

Senator HARRIS. It has been stated that it could be done for very much less.

Mr. MORISON. I think it is possible that it could be done for less. I think the chances are that it would cost more. You see, we do not know what it is, and there is nothing more unsafe than to guess at things that nobody has ever seen. In order to make anything like an accurate estimate of what it would cost to build a tunnel there that whole line should be bored. I have not any definite idea of what kind of rock would be found, and I do not think anybody else has.

Senator HARRIS. I was going to ask you whether you had any information at all as to the geological character of the ridge to be tunneled.

Mr. MORISON. The presumption is that it is volcanic rock, that it is something like what is found everywhere else on the Isthmus, what is found, you may say, on the Coast Range all the way from Oregon to Panama. That is, it is largely basalt; but at the same time other rocks may be found there. It is a country of geological disturbances, and I do not think you can form any judgment that is worth anything as to what kind of rock it is, or as to what it will cost to excavate it; or, in fact, whether you can excavate it as a tunnel, until the line has actually been bored.

Senator HARRIS. You think that the probabilities are that it would be very much broken up and full of faults and a great deal of unstable material?

Mr. MORISON. I do.

Senator HARRIS. You do not think there is any human probability of its being a solid wall of granite?

Mr. MORISON. I should be very much surprised if it was, but I would not say that it is not.

Senator HARRIS. I am speaking of probabilities. What indications did you observe there of the presence of granite to any considerable extent?

Mr. MORISON. I did not go back to the ridge. I only went along the coast. I talked with the men that went back to the ridge, and I saw what there was on the coast. There was nothing I saw which indicated to me that there was granite there, and I do not think I saw any granite on the Isthmus, either at Nicaragua or Panama, or around there.

Senator HARRIS. Even if along the line of a survey granite should be noted in the field books here and there, you would not consider that a reliable indication that there was a solid wall of granite?

Mr. MORISON. No, sir; and even if I knew that the entire isthmus was granite I should not feel that it proved that it was a solid mass of granite, for you find faults and cracks and all kinds of things in granite.

Senator HARRIS. Even in the western mountains, where granite prevails everywhere, we find it broken up in every possible way.

Mr. MORISON. Yes.

Senator HARRIS. With other material.

Mr. MORISON. Yes. We considered what we thought could be done if that ridge was of a good solid rock in which excavation could be made, and on that basis we made our estimate.

Senator HARRIS. And you regarded it as necessary to provide for lining the tunnel?

Mr. MORISON. Yes, by all means. I never should be willing, I think, to send canal traffic through a tunnel that was not lined, even if it was the best granite tunnel I ever saw. I may mention an instance in point. It is not the case of a granite tunnel, but of a limestone tunnel on the Nashville and Chattanooga Railroad, which had what was virtually a perfect roof, a flat roof of solid limestone, which in many respects is better than granite, because the hard limestone strata were all the right way. That roof stood for fifty years, and then began to fall to pieces.

Senator HARRIS. Through atmospheric action and jarring, and so on?

Mr. MORISON. From some cause or other.

Senator HARRIS. All of these things are factors.

Mr. MORISON. There are a great many factors, and the tunnels in granite countries have generally required more or less lining. Then the dropping of a rock in a railroad tunnel is a very different thing from the dropping of a rock on a ship or under a ship. One of the hardest rocks through which we have done any tunneling is the rock of Bergen hill, back of Jersey City, where the Erie tunnel goes, and where the Delaware, Lackawanna and Western has a tunnel. There are several. The Susquehanna and Western has one. That is a solid trap rock, and the Erie tunnel has been in use about fifty years. Yet the other day traffic was interrupted there for hours and a train wrecked. I suppose Senator Platt knows that tunnel very well.

Senator HARRIS. The Panama line was not regarded by the Commission in their first report as the one which they desired to recommend, and apparently—I should like to know if that is correct—the change in their opinion grew entirely out of the reduction in the price at which the property of the Panama Canal Company could be obtained.

Mr. MORISON. Well, I can speak only for myself in that respect. I never should have signed any report recommending the Nicaragua route in preference to the Panama route except on the ground that I felt that the United States could not afford to be held up by a French organization.

Senator HARRIS. The reduction in the price asked for to \$40,000,000 made it come within what you thought was a legitimate and proper price?

Mr. MORISON. I think that is a perfectly proper price. I think our Government could have better afforded to pay twice that price than to have built the Nicaraguan Canal, if that had been the whole question; but the United States Government, as I look on it, has many other things to do than to build an interoceanic canal; and if it allows itself to be imposed upon through an unreasonable price for one piece of property, it may be for some others, and that feeling was what settled my decision. I felt that these French people had put themselves in a position in which we could only treat them as you would treat an oriental trader—tell them that we could not have anything more to do with them if that was the way they talked.

Senator HARRIS. In the final report, Mr. Morison, you mention a great many difficulties which are still to be removed.

Senator HAWLEY. The thing that sticks in my crop, as the slang phrase is, is that if we pay \$40,000,000 for that we shall find a lot of

liens upon it and have 60 per cent to pay on the dividends, if there are any, and we shall have a perfect barnacle load of claims from the French people.

Mr. MORISON. I do not see how those could come at all. I do not see how there can be anything of that kind.

Senator HAWLEY. I think we should have a new set of French spoliation claims.

Mr. MORISON. I can not see how those can come.

The CHAIRMAN. Can you see how they can be avoided?

Mr. MORISON. I do not see how they are going to arise. I think everything of that kind has been settled. It is more than ten years since the collapse of the old French company.

Senator HAWLEY. It is a century since the collapse of the other French claims.

Mr. MORISON. I do not know the conditions of those other claims. I can not say anything about them.

The CHAIRMAN. Have you finished your answer?

Mr. MORISON. Yes.

The CHAIRMAN. I interrupted you for the purpose of ascertaining what you referred to when you said that there were other matters that the United States had to deal with that were of greater concern than even the digging of a canal, if I understood you.

Mr. MORISON. Yes.

The CHAIRMAN. What other matters are those?

Mr. MORISON. I did not have any particular matters under consideration, but I do consider that our Government is going to do a great many other things, that we shall put ourselves in a position where we have got to make purchases from foreigners. I do not refer to canals at all.

The CHAIRMAN. I know you do not refer to canals, and that is the reason I asked you the question. I wanted to know what you did refer to.

Mr. MORISON. I do not refer to anything specific. A case came up recently which is of this order. That is the purchase of the Danish Islands. I do not know what may come.

The CHAIRMAN. You have mentioned some considerations that influenced your judgment in coming to a conclusion in this matter.

Mr. MORISON. I feel that it is important that the United States Government should keep itself in a position in which it is understood that it is not giving what people ask unless it considers it reasonable.

The CHAIRMAN. Have you in your studies of this question contemplated or considered the question as to which of these Governments, Nicaragua and Costa Rica on the one side and Colombia on the other, will grant us exclusive canal privileges at the lowest cost?

Mr. MORISON. I do not know anything about it directly. My impression is that you can do quite as well with Colombia as you can with the other Governments.

The CHAIRMAN. I want to know if you have considered this proposition. You seem to have a poor opinion of everybody down there.

Mr. MORISON. Yes.

The CHAIRMAN. The French, and also the Spanish, if I am right about it?

Mr. MORISON. I think that things have been rather badly handled down there in a great many ways.

The CHAIRMAN. Have you, in your reflections about this matter, trying to reach a conclusion that was valuable and of importance to your country and your Government, considered the proposition of a combination between Nicaragua, Costa Rica, and Colombia to fix a price for exclusive privileges upon that isthmus, and to divide the swag, if you please to call it that, between them?

Mr. MORISON. No; I have not.

The CHAIRMAN. You have not thought about that?

Mr. MORISON. I have not.

The CHAIRMAN. You see now, do you not, that it could be very easily done?

Mr. MORISON. I do not believe it could be very easily done, under the present political conditions down there. It is a thing that might be done.

The CHAIRMAN. It is only the political conditions that are in the way?

Mr. MORISON. I do not see anything else.

The CHAIRMAN. The financial difficulty could be very easily removed by paying \$40,000,000 or \$50,000,000 to the two Governments and letting them divide it, could it not?

Mr. MORISON. I do not know that I am prepared to say how you would handle those Governments. I think I would rather leave that to you, gentlemen.

The CHAIRMAN. So that your opinions, I suppose, as between the two routes, have been based very largely upon what you supposed we could do in acquiring exclusive privileges for canal concessions in either country?

Mr. MORISON. That is a very important factor. I am an engineer myself, and I have looked at this subject from an engineering point of view.

The CHAIRMAN. That is what I supposed.

Mr. MORISON. So far as political rights are concerned, I have considered, assuming the Maritime Canal concessions to be absolutely void, and all rights to have disappeared, that the ground was clear for treaties on the Nicaragua route.

Senator HANNA. Well, is it clear?

Mr. MORISON. It is on that assumption; not on any other.

The CHAIRMAN. Now, I will not interrupt Senator Harris's examination any further.

Mr. MORISON. I have considered that the situation in Colombia was complicated by the circumstances of those prior concessions; that those prior concessions were such that the United States Government could not do anything under them. They are not concessions under which this Government could afford to build; but they were a cloud on the title. At this act of their holders proposing to transfer everything to the United States Government removes that cloud. It gives us an opportunity of getting the desired rights from Colombia. Now it simply leaves the field as clear at Panama as the assumption just made leaves it at Nicaragua. It does no more. The ability of the United States to build a canal in either place must be determined by subsequent treaties; and my judgment is not worth much as to which country you can make better treaties with.

The CHAIRMAN. There is one question which has not been at all mooted here that I want to ask you about. The State of Panama,

under the Wyse concession and under the extension, has a specific right to an annual payment of money by this canal company, and also by the railroad company to that State. Now, in order to get rid of what we call the cloud on the title, is it not necessary also to deal with the State of Panama aside from the Republic of Colombia?

Mr. MORISON. I am not sufficiently familiar with the constitution of Colombia to say. Colombia was formerly supposed to be a federal republic. Its name was the United States of Colombia. It was in that condition when those specific rights of Panama were created. Subsequently they changed the relations of the States and changed the title of their country, which is not now the United States of Colombia, but the Republic of Colombia. It is my impression, though I do not know, that the settlement with the State of Panama should be made through the Government of Colombia. The State of Panama is entitled under the railroad concessions to one-tenth of the annual payment, \$25,000 out of \$250,000.

The CHAIRMAN. Have you, in coming to that conclusion, taken into consideration the guarantee which we make in the treaty of 1846 of the sovereignty of the Colombian Government over that isthmus?

Mr. MORISON. No; I have not considered that particularly in making that answer.

The CHAIRMAN. We will refer to that later.

Senator HANNA. The chairman asked you a question there, if I remember it correctly, as to whether in coming to your decision as to the preference of these routes, you had been governed by the conditions of the concessions? I ask the stenographer to read the chairman's former question.

The stenographer read as follows:

"The CHAIRMAN. So that your opinions, I suppose, as between the two routes, have been based very largely upon what you supposed we could do in the way of acquiring exclusive privileges for canal concessions?"

Senator HANNA. What I wanted to ask you, as to the choice or practicability of routes for canal purposes, the getting of the concessions was a necessity in either case; and from an engineering standpoint, from the standpoint of the physical conditions, you were in favor of the Panama route, as I understand you?

Mr. MORISON. I am, and always have been so since I have seen the two routes.

The CHAIRMAN. Now, Senator Harris, will you proceed.

Senator HARRIS. Speaking of the reasonable price which the Panama people now ask, you regard the construction of a railroad, of course, as necessary to the construction of a canal. That has got to be done in either case?

Mr. MORISON. Practically so.

Senator HARRIS. That railroad, of course, would not be so expensive a road as a permanent commercial road?

Mr. MORISON. Yes; it should be. You have got to have a very good railroad if you are going to conduct your work properly.

Senator HARRIS. Well, the equipment is not of as expensive a character.

Mr. MORISON. You want the very best equipment you can get if you are to handle large quantities of material economically.

Senator HARRIS. Certainly, you want an equipment of that character; but dump cars, flat cars, and all the machinery of that kind are not

so expensive as Pullman cars, or high-class passenger coaches and passenger engines.

Mr. MORISON. It is not as expensive as Pullman cars, it is not as expensive as high-class passenger cars; but the freight engines of to-day are the most expensive locomotives built, the powerful engines to haul heavy loads.

The CHAIRMAN. For great distances?

Mr. MORISON. Anywhere.

Senator HARRIS. Anywhere. Well, then, assuming that to be the case, what would you think would be the necessary cost of a railroad adequate for the doing of the work required in the construction of the canal?

Mr. MORISON. I think the estimate in the Commission's report is not far from right—\$75,000 a mile.

Senator HARRIS. That being the case, do you think it is reasonable for us to pay \$140,000 a mile for the Panama road?

Mr. MORISON. Yes, sir; all things considered, I do. The Panama Railroad holds something more than itself. It has something more than a railroad. The company have a good deal of other property, and they will earn a great deal of money from commercial business during the construction of the canal, whichever canal is built. They will not earn anything after the canal is completed.

Senator HARRIS. Do you think that the amount they would earn in the construction of the canal and the doing of this work would more than pay off the indebtedness which now hangs over them?

Mr. MORISON. Yes; I do.

Senator HARRIS. There is a considerable indebtedness aside from the stock which hangs over that road.

Mr. MORISON. I think the indebtedness is stated in detail in the supplemental report of the Commission. I think it is correct.

Senator HARRIS. I suppose you did not consider the difficulties involved in the United States Government becoming a stockholder in this New York corporation, the Panama Railroad Company?

Mr. MORISON. I considered that there was a method of handling that without much difficulty.

Senator HARRIS. You regard the vital piece of work on the Panama Canal, of course, to be the Bohio dam?

Mr. MORISON. I think the vital piece of work is the Culebra cut.

Senator HARRIS. Do you think that is more difficult?

Mr. MORISON. Yes; I do.

Senator HARRIS. And that there are greater uncertainties involved in the Culebra cut?

Mr. MORISON. No; I do not know that there are any great uncertainties in either case, but it is a very great mass of work.

Senator HARRIS. Do you think it would take longer to do it than the other?

Mr. MORISON. Yes.

The CHAIRMAN. Did you say there were any uncertainties in either?

Mr. MORISON. I do not think there are any serious uncertainties in either.

Senator HARRIS. Mr. Morison, here is an article which appears in the proceedings of the American Society of Civil Engineers, in which you say, alluding to the Bohio dam:

“It involves novel and untried features. Few engineers, even among

those who feel that they could construct it, would be ready to say in advance how the work would be done. The difficulties, taken in connection with the climate and other surroundings, are enormous."

Mr. MORISON. Yes.

Senator HARRIS. That, to me at least, indicates that there were some uncertainties. "Novel and untried features" would indicate uncertainties.

Mr. MORISON. Well, that certainly does indicate something in the way of uncertainties, I suppose. If you come right to the facts, I do not consider that the solution of the dam given by the Commission was the wisest one.

Senator HARRIS. Now, Mr. Morison, if you will kindly, in your own way, state what you think generally are the objections to the general plan of the Bohio dam we shall be glad to hear your statement.

Mr. MORISON. I think it is unnecessarily expensive; that is the principal thing. I think I see a method of solving the problem for very much less money and with no element of special difficulty.

Senator HARRIS. That is, you mean by the substitution of the plan which you indicate in this article published in the proceedings of the American Society of Civil Engineers, January, 1902?

Mr. MORISON. I do.

Senator HARRIS. Which is earth and stone?

Mr. MORISON. Yes.

Senator HARRIS. Practically?

Mr. MORISON. Yes.

Senator HARRIS. And sheet piling?

Mr. MORISON. That is of no particular importance. I put it in because I could. I thought it would be about as well to leave it out.

Senator HARRIS. You consider that really would not be of very much importance in preventing filtration?

Mr. MORISON. No, sir; I do not think it would be of importance. I think it is of very little importance anyway.

Senator HARRIS. That is a permeable material.

Mr. MORISON. There is a permeable material down in the bottom of the Chagres Valley. It is a question of how much you can afford to pay to cut off the seepage through that permeable material.

The CHAIRMAN. What particular class of material is it that you call permeable?

Mr. MORISON. Sand and fine gravel—material through which water will penetrate. It seemed to me that it was not worth while to pay a great deal, or to undertake very difficult work, for the purpose of cutting off that seepage.

Senator HANNA. The water would have to penetrate through what depth of clay before it would reach the sand?

Mr. MORISON. I do not feel sure it would have to penetrate any clay. I think very likely that the sand reaches the river at some point above; but it would have to run at least half a mile, and probably 2 miles through the sand, to get out at the other end.

Senator HARRIS. In your article you speak of the fact, demonstrating the connection between the river and this permeable material, being shown by driving a pipe down and the water rising to the level of the river in the pipe?

Mr. MORISON. Yes.

Senator HARRIS. And that shows, of course, there is a connection?

Mr. MORISON. Yes. Whether it is a connection above or below we do not know.

Senator HARRIS. Or at the side?

Mr. MORISON. It can not be at the side. We know that. It is a connection with the water in the river somewhere.

Senator HARRIS. Of course we have here the plan of the dam as recommended by the Commission, involving the sinking of caissons, and in this drawing they seem to let the upper edge of the caisson rest upon the stone, and a considerable of it below. That, of course, must be an error?

Mr. MORISON. No, sir; that is correct.

Senator HARRIS. Is that the way it is intended?

Mr. MORISON. Yes; but the space between that caisson and the stone would be filled with concrete; that is, that the sand would be cleaned out and other material put in.

Senator HARRIS. You would have to excavate until you reached the bed rock?

Mr. MORISON. Certainly.

Senator HARRIS. The entire width?

Mr. MORISON. To carry out that plan we would.

Senator HARRIS. And put in impermeable material, such as concrete?

Mr. MORISON. Yes.

Senator HARRIS. What is the limit of engineering experience in pneumatic work in this country—that is, the depth to which it has gone?

Mr. MORISON. There may have been some recent work of which I do not know the depth. The greatest depth at which I have ever worked men was, I think, 108 feet. They were worked to a depth of 115 feet at St. Louis.

Senator HARRIS. It has been stated that 110 feet was the limit there.

Mr. MORISON. It was over 110 feet at St. Louis. I have been told that pressures have been used which were equivalent to a depth of 130 feet, but that I am not positive about. This is from information and belief.

Senator HARRIS. This has been on work for foundations for bridge piers and dams, and work of that character?

Mr. MORISON. Yes; and some of it in tunnel work.

Senator HARRIS. And, of course, covered by the limits of one caisson?

Mr. MORISON. I do not understand your question.

Senator HARRIS. What I mean is this: This seems to provide for caissons, I think, about 30 by 100 feet.

Mr. MORISON. Yes.

Senator HARRIS. That is about the size of the excavations in the cases you speak of?

Mr. MORISON. I used a caisson at Memphis that, as I recall it, was 60 by 90 feet.

Senator HARRIS. That was for the bridge pier?

Mr. MORISON. Yes.

Senator HARRIS. There of course you had no problems with regard to any connection around it. You were simply sinking it down and getting a foundation for that area?

Mr. MORISON. Yes.

Senator HARRIS. Here of course the difficulty would be encountered in the connection of each caisson with the other?

Mr. MORISON. Yes; there would be some difficulty.

Senator HARRIS. So as to prevent water passing between?

Mr. MORISON. Yes; trying to make it absolutely tight.

Senator HARRIS. It would be desirable to make it absolutely tight, would it not?

Mr. MORISON. That would depend upon what it cost. I do not think it is very important to close the flow of water through that stratum down there alone. The calculations that I have made make me feel that it is not worth the cost.

Senator HARRIS. That is why in your plan you are trying to disregard some of the flow of water?

Mr. MORISON. Yes.

Senator HARRIS. You concluded it would not be dangerous?

Mr. MORISON. During the last few years a great many experiments have been made to determine the rate of filtration through sands. It is a comparatively new subject. It has been investigated with special care in Massachusetts, where they have had a double question. They have had the question of water supply for the metropolitan district, and other points in the State, and they have had the question of dams; their experiments have been carefully conducted, and very careful results have been worked out from them. They have prepared a formula which shows probably quite as accurately as any hydraulic formulæ do the rate at which water will filter through sands under various heads.

In the new Wachusett reservoir, on the Nashua River, above Clinton, they have accepted that condition in planning one of their dikes, and are making no attempts to close an old geological channel which has sand in it away below the present surface of the ground. I have made various calculations on the amount of water that would pass through that permeable stratum below. I have shown my conclusions to the engineers who have done that work in Massachusetts. I have had the samples of sand taken from those borings analyzed by the man who made the analyses there for the metropolitan board of health, and the conclusion I have come to is, that there is no chance whatever that the filtration would exceed 40 cubic feet per second, and I should be very much surprised if it is over 10 cubic feet per second; I do not think you can afford to pay very much to get rid of that.

Furthermore, there are various ways in which I believe that sand could be made water-tight, but I do not believe it would be necessary. Various things have been done in the way of grouting sands with cement and with clay.

Senator HANNA. In that connection, you have made the dam feature a specialty in connection with the report of this Commission?

Mr. MORISON. I have studied it up a good deal. I dissented from the conclusion of the Commission that this dam was a piece of work of great difficulty.

Senator HAWLEY. What conclusion?

Mr. MORISON. The conclusion that that dam was a work of great difficulty. It seemed to me that it was not.

I did not consider it expedient to separate myself from the Commission on account of a single detail; but if I had been compelled to make a minority report, as I was at one time, when I had prepared one, I should have referred particularly to that point.

Senator PRITCHARD. How long have you been engaged in the business of engineering?

Mr. MORISON. Thirty-four years.

Senator PRITCHARD. What experience have you had during that time outside of this particular undertaking?

Mr. MORISON. Well, I have had a considerable variety of experience. I have done a great deal of work on Western rivers, and I have done more or less railroad work.

Senator HANNA. Have you been engaged in many operations connected with the sinking of caissons for foundations and for building dams and bridges?

Mr. MORISON. I have had a great deal to do with the sinking of caissons for foundations. I think I must have been chief engineer of more than 12 bridges in which that process has been used. I can count up now ten on the Missouri River alone.

Senator HANNA. So that your experience in that sort of work has been about as extensive as that of anybody in the country?

Mr. MORISON. My experience in caisson work has been.

The CHAIRMAN. What line of railroad on the Missouri River do you refer to?

Mr. MORISON. I built the bridge of the Northern Pacific at Bismarck, the Northwestern bridge at Sioux City, the Northwestern bridge at Blair Crossing, the Union Pacific bridge at Omaha, the Burlington bridge at Plattsmouth, the Burlington bridge at Nebraska City, the Burlington bridge at Rulo, the new bridge at Leavenworth. I overhauled the bridge at Kansas City and I built the Burlington bridge at Bellfontaine Bluffs.

Senator MILLARD. You built nearly all of them?

The CHAIRMAN. You built the Memphis bridge?

Mr. MORISON. Yes. I built the Cairo bridge and I was consulting engineer of the Merchants bridge at St. Louis.

The CHAIRMAN. Are you the consulting engineer of these other companies you mentioned, now?

Mr. MORISON. No, sir.

The CHAIRMAN. None of them?

Mr. MORISON. I have a sort of a nominal—a slight connection with the Chicago and Northwestern Railway, but it is not regular. They occasionally call me in. Then I built the bridge across the Snake River at Riparia, and across the Willamette at Portland, although I did not use the pneumatic process in that. I started to build a bridge across the Columbia River at Vancouver, and got one foundation down, when the panic came and stopped the work.

Senator HARRIS. With regard to the Culebra Cut, what do you think are the difficulties involved there?

The CHAIRMAN. Before you take up that, I wish you would ask Mr. Morison something about that temporary dam.

Senator HARRIS. The Commission have made an estimate for a temporary dam, preparatory to building the one at Bohio. Did they consider it unnecessary, or was it included in the estimate?

Mr. MORISON. It is included as a lump sum.

Senator HARRIS. You add a very considerable amount for that purpose?

Mr. MORISON. Yes; in the paper of mine which I see you have here, I wanted to go into a little more detail in the matter of a temporary dam, so that I might be sure that my estimate had an actual detailed basis, and the temporary dam which is described in that paper was

designed for that purpose. I considered that the plan would very probably be materially modified before it was built. It may be possible to build the dam without it; but I thought that the estimate should include it now. The Commission's estimate, I think, contains a round sum of \$500,000 for the temporary dam, and that amount was deducted from the estimate in the Commission's report for the Commission's dam in the price given in my paper.

Senator HANNA. In the construction of the dam, no matter what may have been the estimates and plans made originally, of course the engineers in charge of the construction might make changes and modifications, and would certainly take the precaution to prepare for any emergency or any conditions that might arise as the work was actually done.

Mr. MORISON. I should certainly think the engineers in charge of the work should have the right to make very material modifications.

In this connection there is another feature about the Panama Canal. Our examinations and estimates indicate that that canal can be shortened a mile and a quarter, and the expense lessened by so doing.

The CHAIRMAN. At what point?

Mr. MORISON. By running directly across from Bohio to Gatun instead of following the present valley of the Chagres—following the Panama Railroad and leaving the old valley of the Chagres as the line for the discharge of the water from the spillway.

Senator HARRIS. The French road follows the valley of the Chagres?

Mr. MORISON. Yes, sir. You mean the French canal?

Senator HARRIS. Yes; the French canal.

Mr. MORISON. That is the proper route for a tide-level canal. The conditions of a sea-level canal are different; but if you are going to build a canal with locks and turn the water into another channel, the indications are that this other route will be the better one.

But the Panama estimate was generally made on a rather liberal basis, and things of that kind were left out.

Senator HARRIS. You materially changed the French plans by taking out the French summit level entirely?

Mr. MORISON. Yes; we did.

Senator HARRIS. The French, I believe, had made borings in the Culebra Cut to the bottom of their summit level, to ascertain the quality of the material?

Mr. MORISON. They have made borings deeper than that. They had two plans, one with a summit level at elevation—I can give them only approximately—one with a summit level at elevation 125, and the other with a summit level at elevation 63 feet. They made their borings to the level of the bottom of the canal on the plan with the lower summit level.

Senator HARRIS. So that you think the quality of the material to be encountered in the Culebra Cut, in getting to the lower level required by the Commission plan, has been thoroughly uncovered and demonstrated.

Mr. MORISON. Yes; I believe it has.

The CHAIRMAN. With regard to the borings for the foundation of the Bohio Dam, they were about 50 feet apart, generally, I believe.

Mr. MORISON. They were rather more than that. I think they were about 200 feet apart. I could tell you exactly. There is a map that shows it. We bored over a considerable reach of country. This

plan shows the distance apart of the borings on the line of that particular dam. They are about 200 feet apart here.

Senator HARRIS. Borings 200 feet apart may leave very considerable contingencies to be accounted for in a more careful examination.

Mr. MORISON. In that class of rock they can. That is one reason why I felt gratified when I thought I had worked out a scheme which was independent of the result of such borings.

Senator HARRIS. You did not consider the determination of the bed rock there as sufficiently demonstrated?

Mr. MORISON. I think there may be holes which are deeper. I do not think they would do any harm, though.

Senator HARRIS. Well, those holes would probably be filled with this permeable material?

Mr. MORISON. Yes.

Senator HARRIS. The presumption is gravel and sand?

Mr. MORISON. Yes.

The CHAIRMAN. Mr. Morison, you speak of geological valleys. Do you understand how those valleys happen to be; whether they are the result of the flow of water through depressions, or of earthquakes, or of other dislocations of the bed rock or the bed material?

Mr. MORISON. No, sir; I do not. Some of them may be formed in one way and some of them in another.

The CHAIRMAN. As to this particular one, how is that formed?

Mr. MORISON. Well, I do not know.

The CHAIRMAN. You do not know?

Mr. MORISON. No, sir; I doubt whether anybody does; but still there are other people who may. A geologist would know more than I do.

The CHAIRMAN. I will ask you if you believe it might have been formed by water rushing down and carrying out the material?

Mr. MORISON. Not unless the whole level of the Isthmus was very much higher than it is now. The valley is well below the level of the sea, and you could not have water rushing down it to do that unless the valley itself was above the sea.

The CHAIRMAN. Even Niagara Falls has given way very materially in the course of fifty or a hundred years.

Mr. MORISON. Yes; but they are away above Lake Ontario.

The CHAIRMAN. They have receded, nevertheless, and changed in their appearance.

Mr. MORISON. Yes; but they are above the water. This valley is below.

Senator HARRIS. Mr. Morrison means that for erosion to take place there has got to be a fall. Of course, that is correct.

Mr. MORISON. What I mean by a geological valley is that a valley can be traced in the rock well below the present surface of the country; that that valley is filled up with material which is not rock, some of which is water-tight and some of which is not; and quite a lot of stuff in the very lowest portion of it is permeable to water—is not water-tight.

Senator HARRIS. I should like to have you state to the committee your opinion as to the comparative difficulty in the construction of this flight of locks; that is, the locks with a maximum lift of 45 feet, each being right together. That is what the Commission means when it speaks of a flight of locks.

Mr. MORISON. Yes. You pass from one lock directly into the other.

Senator HARRIS. As regards any locks that you know of, now actually constructed, in their comparative height and difficulty of construction.

Mr. MORISON. Those locks are larger than any now in existence. I see nothing specially difficult about their construction.

Senator HARRIS. Does not the fact that two locks are right together, that you go from one immediately into the other, make them somewhat more difficult than if they were separated?

Mr. MORISON. No, sir; I see no reason why it does. It is a perfectly common thing to build locks in flights. The old locks at Sault Ste. Marie were in a flight.

Senator HANNA. And on the Welland Canal also.

Senator HARRIS. I was thinking of the great height of the wall involved in this, and the depth of the gates.

Mr. MORISON. Well, it makes a big gate, but I see no serious objection to it. The upper gate of the upper lock is high enough to admit vessels when that lock is full. The lower gate of the upper lock is high enough to let vessels out when that lock is empty, and that is just the same that it would be if you let them out directly into the canal. The gates are no higher than they would be for single locks with the same lift. It simply makes a larger concentration of masonry in one place.

Senator HARRIS. With the extraordinary height, that is, a total lift there of 90 feet, the walls, of course, have to be adequate to that.

Mr. MORISON. Yes.

Senator HARRIS. Does that present any more danger from earthquake action than if they were lower?

Mr. MORISON. No; I do not think it does. It is possible to use locks of less lift. You can put in locks of only 28 feet lift, and put a third lock below.

Senator HARRIS. That would make a greater number of locks.

Mr. MORISON. Yes; there is a very good place below to put another lock. I think there are arguments in favor of doing it, but that is one of the questions which I should expect to come up when the canal is actually built. It takes a little more time if you have the other lock, and it was considered better to use those locks. There is a lock of about the same lift, a single lock on the Nicaragua route.

Senator HARRIS. Thirty-six feet and a half.

Mr. MORISON. I thought there was one, under extreme conditions, of about 41 feet.

Senator HARRIS. In the Nicaragua plan the dam at Conchuda presents no more difficulties, does it?

Mr. MORISON. I think it is more difficult to build than any dam that has ever been built. Everything about it, every detail, is within limits that have been met. I do not think any dam has ever been built which is as difficult to construct as that Conchuda dam.

Senator HARRIS. Except the dam at Bohio. Do you not think that would be more difficult to construct?

Mr. MORISON. That has not been built.

Senator HARRIS. I am speaking of its being in contemplation.

Mr. MORISON. With the plan which I should favor for the Bohio dam it would be extremely simple. I think that plan is more difficult than the Conchuda dam, but I think the Conchuda dam is more difficult

than any dam that has ever been built. The Bohio dam has not been built.

Senator HARRIS. By "that plan" do you mean the plan of the Commission?

Mr. MORISON. Yes.

Senator HARRIS. Dams have been built equally high as the one at Conchuda?

Mr. MORISON. Yes.

Senator HARRIS. And with foundations equally deep?

Mr. MORISON. Yes; but never where it was necessary to let the river run over the foundation while the dam was being built. In this case you have got to put a foundation down in a river that you can not divert.

The CHAIRMAN. That is the real difficulty at Conchuda.

Mr. MORISON. That and its magnitude. Generally dams with very deep foundations have been in positions where it was possible to lay bare the bottom of the river and put the whole dam in dry.

The CHAIRMAN. Is that more difficult than it was to put a caisson down at the Memphis bridge?

Mr. MORISON. I do not think it would be any more difficult to put down a single caisson than the caisson at the Memphis bridge, barring the difference in the surrounding conditions.

The CHAIRMAN. The Memphis bridge caisson was deeper in the river.

Mr. MORISON. Yes.

The CHAIRMAN. And there was a stronger body of water to resist.

Mr. MORISON. That does not amount to anything after your work gets started. One of our foundations at Memphis, the deepest one, we put in without any trouble whatever of any kind. In the second foundation, before we began sinking the caisson, when we first landed it on the bottom, we were caught by a flood, and for a day or two had a pretty tough time; but as soon as we got fairly started sinking all those difficulties were over.

Senator HARRIS. What is your idea of the general character of the work along the Nicaragua Canal? Does it present anywhere any very serious difficulties aside from the question of magnitude?

Mr. MORISON. I do not know that it does, except that I think that swampy country between Greytown and the San Juan River is going to be a very difficult country to work in. It is practically a continuous swamp.

Senator HARRIS. That is, about 12 miles.

Mr. MORISON. Oh, it is about 40 miles, practically.

Senator HARRIS. All of it.

Mr. MORISON. Yes.

Senator HARRIS. Hills and swamps together?

Mr. MORISON. The line strikes hills, but until it gets up into the last few miles it is more in swamps than in hills.

Senator HARRIS. The magnitude of the work there is not very great, but the difficulty, you think, is in the class of material to be handled.

Mr. MORISON. Well, I refer to working through that long swamp, with the conditions which attend it. It is a swamp throughout. There are no roads in it. You can not make any roads except by hauling in material to make them. There have never been any, and there is a good deal of timber in that swamp. How much of it is below the water I do not know. I do not think we have any idea; but there is, in my

mind, a very uncertain element as to how much timber you will find to interfere with your dredges while working in that swamp.

Senator HANNA. What is the bottom—ooze?

Mr. MORISON. All kinds of things; in some parts sand. A good deal of it is ooze—soft. It is perfectly natural that there should be a swamp in a country of such excessive rainfall.

Senator HARRIS. But did the French have any special difficulty in that piece of swamp just back of Colon?

Mr. MORISON. I think not. But that is a very different swamp from the one back of Greytown.

Senator HARRIS. The swamp at Greytown is greater in extent.

Senator HANNA. What is the difference?

Mr. MORISON. The swamp at Greytown is very much larger in area, and it has a much heavier growth of timber on it. The swamp back of Colon is more like a river bottom which is more or less overflowed.

Senator HARRIS. Well, aside from it being timbered, I suppose there would be no very great difficulty in its character?

Mr. MORISON. I should think there was. They look entirely different.

Senator HARRIS. In the construction of the harbor at Greytown, as compared with the construction of the additional harbor which is required at Colon, the estimates seem to be in favor of Greytown.

Mr. MORISON. Yes.

Senator HARRIS. Do you think there is any great difficulty in obtaining sufficient depth of water at Greytown?

Mr. MORISON. That whole coast is made entirely of sand. You have simply got to dig out your sand and protect it and keep it dredged. At Colon there is coral rock, and the increased cost of the harbor at Colon is due very largely to the fact that our estimates were made on a canal 35 feet deep, instead of 30, as has hitherto been talked of. The French plan provided a canal a little less than 30 feet deep. That is about the normal depth of the present harbor at Colon. In order to adapt that harbor to 35 feet you have got to make a channel. That channel can be deferred until the canal is finished, if desirable, because there are not many ships that can not go through a harbor 30 feet deep.

Senator HARRIS. But if you make a canal 35 feet deep you have got to make the entrance deep enough to enable ships to go up it.

Mr. MORISON. I say it could be deferred until the canal was opened. You can open the canal to most classes of service now before deepening that. It should be done, sooner or later.

Senator HARRIS. As a practical proposition, I should like to know whether you think that really there is a necessity for making the canal 35 feet deep?

Mr. MORISON. Yes; I do.

Senator HARRIS. You think it ought to be that deep?

Mr. MORISON. Yes, I do. I believe myself that the traffic through that canal will be done in the largest ships that are running anywhere in the world.

Senator HAWLEY. Through the Nicaragua Canal?

Mr. MORISON. Through the canal, whichever it is. It will all be long-distance trade, and long-distance lines find their greatest profit in large ships. A large ship can be run, in proportion to her cargo capacity, more cheaply than a small one. The trouble is it takes too long to load and unload it.

Senator HANNA. And then the item of fuel is a very important factor?

Mr. MORISON. Yes.

Senator HANNA. To carry fuel enough to complete the voyage?

Mr. MORISON. Yes.

Senator HARRIS. There is another question about which I should like to have your opinion. That is as to the necessity of double-chambered locks. Do you think the traffic will be so great as to require that for a great many years?

Mr. MORISON. No, sir; I do not. I think a one-chamber lock would accommodate all the business. I do not look to see more than ten ships a day going through that canal, five each way.

Senator HANNA. The duplicate lock could be built at any time.

Mr. MORISON. Yes.

Senator HARRIS. You could look forward to completing it afterward.

Mr. MORISON. But I consider that the second lock is needed as an element of insurance. You can not afford to have your canal blocked by an accident to one lock. If you knock down a gate, or anything goes wrong with a lock, your whole traffic is closed until it is repaired.

Senator HARRIS. Then it is simply a matter of reserve accommodation?

Mr. MORISON. If you have two locks, you can use one while you are repairing the other. That is the only reason that I can see for using double locks, but I think it is a sufficient reason.

The CHAIRMAN. I believe, Mr. Morison, that you were assigned as chairman of a subcommittee of three engineers to investigate the Panama route and the routes lying below or to the eastward.

Mr. MORISON. I was on two committees. One was for the Panama route, and of that I was not chairman. One was for the routes east of Panama. I was chairman of that committee.

The CHAIRMAN. You devoted your special attention to those routes.

Mr. MORISON. Yes.

Senator HAWLEY. Have you paid any attention to the Darien route?

Mr. MORISON. Yes; I have, a great deal.

The CHAIRMAN. He testified about that before you came in, Senator.

Senator HAWLEY. What does he think of it?

Mr. MORISON. Which route?

Senator HAWLEY. That one that calls for a 9-mile tunnel, the San Blas route.

Mr. MORISON. The San Blas route is the best that has ever been discovered on the Isthmus, until you get in 2 miles from the sea at each end.

Senator HAWLEY. At which end?

Mr. MORISON. At each end. It is more than 2 miles on the Pacific end. So far as length of line and convenience of approach and harbors are concerned it is the best line there is; but it involves a tunnel which I consider absolutely fatal to it.

Senator MILLARD. You feel that the tunnel is impracticable?

Mr. MORISON. Yes; and even if that tunnel were perfectly practicable, I consider that the objection to taking ships through a tunnel 4 or 5 miles long would exceed all possible benefits and advantages which that line might have.

Senator MILLARD. What are the objections?

Mr. MORISON. In the first place, the tunnel ties you up in your

dimensions. You can not enlarge the tunnel. When it is done you never can increase the size of your ships. It is the unit. Two ships can not meet in the tunnel. You have to send one ship through at a time. Perhaps you can follow it by another going in the same direction, but no ship can come through from the other direction until the tunnel is cleared. Then you have the question of ventilating that tunnel. You have your bad air coming out of your smokestacks and all that kind of thing while you are going through. You have a large water resistance in there. If anything happens to a ship in the tunnel it is going to be a very awkward thing to get it out. If anything should happen which would cause the ship to sink or ground in the tunnel it would be a very difficult thing to get her out at all. Here is a sketch showing the size of tunnel selected by the Commission and the steamer *Deutschland* going through it. You see her masts would have to be changed.

Senator HAWLEY. That is a cross section of the tunnel?

Mr. MORISON. Yes.

Senator MILLARD. This is supposed to be a ship passing through there?

Mr. MORISON. Yes.

Senator MILLARD. It would pretty well fill the tunnel?

Mr. MORISON. Yes. Now, if anything happened to the ship, how would you get hold of it to get her afloat?

Senator MILLARD. I do not know. That is what I am asking you about.

Mr. MORISON. I do not know.

Senator MILLARD. I have heard a good many people speak of this as a proper thing to do, as a great saver of money and distance.

Mr. MORISON. I do not think it would save any money, and it would involve risks which you would not have on the other routes.

Senator HANNA. In the cost of operation you would save money by a sea-level canal, would you not?

Mr. MORISON. Very little. It costs very little more to operate locks. The cost of operation of locks is very small. That would be a canal anyway 30 miles long, which is a canal all the way. One of the advantages of this present plan of the Commission, the plan for the Panama Canal, is that your canal is nowhere over about 20 miles long. You go barely 20 miles and you come to Lake Bohio, where there is good anchorage, where you can lie up if anything is wrong, where there is plenty of room for passing, and when you get to the other end of that lake it is only about a dozen miles then to the Pacific.

We will suppose two fleets of half a dozen ships each waiting at each end of the canal in the morning. They could start in, one from Panama and the other from Colon. They would meet in Lake Bohio, where there was plenty of room to pass, and each of them would go through the last lock by daylight and be able to go out into the other ocean; or, if they wanted to enter the canal in the afternoon, they would get up to Lake Bohio, and if they did not want to go through any portion of the narrow canal in the darkness they could anchor there and go down in the morning. I think to get through this canal 30 miles long with the tunnel would be quite as great as to go through the Panama Canal would be, every bit.

Senator MILLARD. Would it be practicable to carry a ship through that tunnel by electrical power?

Mr. MORISON. I suppose it might be done.

Senator MILLARD. I know it was suggested by an engineer.

Mr. MORISON. It would require very powerful machinery to do it.

Senator HARRIS. There is really no reason why that outside power should be used instead of the ship's own power, is there?

Mr. MORISON. Yes; there is in the tunnel. If you use an artificial outside power you do not fill your tunnel with smoke. That is the only reason; but the amount of power that it will take to go through the tunnel even at 4 miles an hour is very large. To take that ship through at 4 miles an hour would probably require 5,000 horsepower and more. It would be likely to take 10,000 horsepower.

Senator MILLARD. The length of this tunnel is about 5 miles, is it not?

Mr. MORISON. That depends entirely on how deep you make the open cut. In the various routes we considered I think the lengths of tunnel varied from a mile and a half to about 5 miles.

Senator HARRIS. That would require an open cut 400 feet deep?

Mr. MORISON. Yes; which is a hundred feet higher than people have generally considered expedient.

Senator HARRIS. What do you think of the feasibility of a sea-level canal at any time in the future at Panama?

Mr. MORISON. A sea-level canal is feasible now at Panama if you are willing to take twenty years to build it. It will be very much more difficult to enlarge a canal built there with locks to a sea-level standard than to build a new one.

Senator HARRIS. The location would be varied somewhat?

Mr. MORISON. There is another possible location at Panama which, if the lock canal were built on the present line, might possibly be available for a sea-level canal; but my impression is that it would be better to deepen the canal near the present location.

Senator HARRIS. A good deal has been said about curvature. The Commission made ample allowance for the difficulties of curvature on both lines. On the Nicaragua line, where there was supposed to be more curvature, their plan contemplates the possibility of a ship navigating the canal without any difficulty, and without the necessity of tugs in getting around curves, does it not?

Mr. MORISON. Yes; it contemplates that, and the curvature in the Commission's report is very much less than that of any previous commission's report. At the same time there is a great deal more curvature, very much sharper curvature, by the Nicaragua route than by the Panama route.

Senator HARRIS. Do you remember what is the curvature on the Manchester Canal—the shortest radius?

Mr. MORISON. I can not tell you, but it is pretty sharp.

Senator HARRIS. Less than 2,000 feet?

Mr. MORISON. I think it is about two thousand feet. They have a good deal of trouble in navigating the Manchester ship canal, which I think is principally due to want of draft.

Senator HARRIS. The canal, I believe, is of less width than is contemplated here.

Mr. MORISON. Yes; this canal is of very large dimensions. And there is a thing about the tunnel which I forgot to mention. That is 100 feet at the base, which is 50 feet narrower than we contemplated for the canal anywhere else in our estimates.

Senator HARRIS. The question of draft would be a very serious one in there owing to the constriction and the shallowness too.

Mr. MORISON. Yes; and the resistance, in taking a ship through there.

Senator HARRIS. Dragging the water.

Mr. MORISON. Yes; the water has got to get behind you, and one effect of carrying that water through a narrow space is going to be that the surface will sink, and instead of having 35 feet, you will probably have about 33½, or something like that; perhaps not as much. This shows 40 feet at the center, but only at the center. It is proportioned for 35 feet.

Senator MILLARD. Your ships would all have to go one way at a time only.

Mr. MORISON. Yes; even little ones. I do not believe I should be willing to have any ship pass another in the canal.

Thereupon (at 11.50 o'clock a. m.), the committee took a recess until 2.30 p. m.

WASHINGTON, D. C.,
Wednesday, February 12, 1902.

The subcommittee met at 2.30 o'clock p. m.

Present: Senators Morgan (chairman), Hanna, Foster, Kittredge, and Harris.

ADDITIONAL STATEMENT OF MR. GEORGE S. MORISON.

Senator HANNA. You have stated that you are a member of the Isthmian Canal Commission.

Mr. MORISON. I have.

Senator HANNA. And that you have spent in that work about how long a time?

Mr. MORISON. Well, it is about two years and a half since I was appointed on that Commission, which has taken the major part of my time, either in work or thought, since I was appointed.

Senator HANNA. And of course you have made a very careful study of this question in all of its features, bearings, and results?

Mr. MORISON. I have endeavored to.

Senator HANNA. Taking into consideration all the information and bringing to your aid all of the experience of your life as an engineer, which route, in your judgment, is the best for this Government to establish as an isthmian canal, to be owned and operated by the United States?

Mr. MORISON. I think the Panama route is decidedly the best, and for a good many reasons.

Senator HANNA. If you care to, you can state the reasons.

Mr. MORISON. Well, in the first place, I think it is better simply as a matter of engineering construction. The construction of the Panama canal is work which is now practically visible; the country has been cleared and we can see what it is. It consists really of two or three classes of work only, of which, with my views as to how the rest of the work should be done the Culebra cut is the only one of extraordinary

magnitude, the only one which would control the time of construction. That Culebra cut is undoubtedly the largest piece of earthwork ever attempted; it will require special machinery to carry it out economically. It is a piece of work that reminds me of what a teacher said to me when I was in Exeter, over forty years ago, that if he had five minutes in which to solve a problem he would spend three in deciding the best way to do it. I think if you spend two years in getting ready you will have the work done quicker than if you start in six months, and I think that with a thoroughly organized outfit that work can be done for a less price than the Commission has estimated.

Mr. HANNA. And in less time?

Mr. MORISON. Probably it can. It is a question of special machinery, but machinery which we know how to make. It is preeminently the kind of work which American contractors adapt themselves to doing. Then I consider that the question of water supply and the regulation of the summit level has been solved in a very satisfactory way. Beyond that, the question of the harbors, though perhaps not much less expensive, are much less complicated and involve many less doubtful features than the control of the harbors at Nicaragua. Panama is now all that is needed. Colon is all that is needed for vessels drawing 26 feet and under for three hundred and sixty-two days of the year. It has to be deepened, and there has to be some method of allowing ships to run in under shelter during the two or three days when there is a northwest wind.

Senator HARRIS. That two or three days of northwest wind you intend to mean the storm intervals that occur occasionally throughout the year?

Mr. MORISON. They very seldom occur more than once or twice a year.

Senator HARRIS. You do not mean that there is any series of two or three days when there is a northwest wind?

Mr. MORISON. No, sir; but I mean that those winds come, and when they come, ships can not lie at the wharves. They have never been able to do so.

Senator HANNA. But that does not occur oftener than once or twice or three times a year.

Senator HARRIS. That is what I was getting at, that he meant the occurrence of those storms.

Mr. MORISON. In some years it may not occur and in some it may occur two or three times a year. The Pacific Mail steamers in old times used to run out and go to Porto Bello, where they were amply protected.

Senator KITTREDGE. How far is that from Colon?

Mr. MORISON. Fifteen or twenty miles. It is a little harbor that was the first Spanish port there.

In general, I feel that the estimates for the Panama work are liberal and it will probably be finished for the estimated sum. I do not believe the Nicaragua route will. I think the percentage allowed, when you consider that it is an undeveloped country where nothing has ever been done and where knowledge is derived only from borings and surveys, and much preliminary work, which has been done at Panama, remains to be done at Nicaragua. I think that instead of that adding a contingent allowance of 20 per cent, it would properly be about 30 per cent.

Senator HANNA. That would make a difference in the neighborhood of ten or fifteen million dollars?

Mr. MORISON. Yes, sir.

Senator HANNA. With the Panama canal completed, a ship can enter the canal by either end in the morning and pass the last lock and probably come into the ocean by dark?

Mr. MORISON. Yes; I consider that a very great advantage. Canals can be navigated by night, and I have no doubt they will be, but you want to avoid it if you possibly can, especially in one of those climates which is subject to serious rains. Lake Bohio makes an artificial lake in the middle of the canal which, when completed, will not be different from a natural lake, and it has all of the necessary space for anchorage and anything of that kind; a ship can lie there over night, or fleets that enter both ends in the morning can pass there.

Senator HANNA. How long is that lake?

Mr. MORISON. About thirteen miles; the wide portion of it is perhaps eight.

Senator HANNA. To a depth of water all over?

Mr. MORISON. The upper end is not deep enough for big ships to get out of the channel. At the lower end there is a great abundance; small ships could go some distance from the channel in the upper end.

Senator HARRIS. What is the greatest width of the deep water, if you remember?

Mr. MORISON. I can not tell you that, but it would be measured by miles.

Senator HANNA. The lake must extend very considerably—some distance above the dam?

Mr. MORISON. The lake fills not only the valley of the Chagres, but the valleys of the tributaries of the Chagres, and the greatest width would be where it filled up one of those side tributaries. It is a very irregular-shaped sheet of water.

Senator HANNA. There would be bays around the edge of the lake, with deep water?

The CHAIRMAN. Do you recollect how many tributaries there are into Lake Bohio?

Mr. MORISON. No, sir.

Senator HANNA. Is there more than one?

Mr. MORISON. Yes; every stream that runs into the lake is a tributary, and some of them are so small that they are insignificant, and there are several of size.

The CHAIRMAN. Can you name any one of the principal ones?

Mr. MORISON. The Gigante comes in from the south.

The CHAIRMAN. Does that go into the basin of the lake?

Mr. MORISON. Yes, sir.

The CHAIRMAN. And flows through and enters into the Chagres River?

Mr. MORISON. Yes, it does now flow into the Chagres River. When the work is done the Chagres River will flow up the course of the Gigante and discharge over the spillway.

The CHAIRMAN. And come out the other way?

Mr. MORISON. Yes. I can not recall names of the streams. There are several others.

The CHAIRMAN. Does that Gigante Creek enter into the Chagres, unite with the Chagres, above the Bohio Dam?

Mr. MORISON. Yes, it does.

The CHAIRMAN. How far above?

Mr. MORISON. About 2 miles.

The CHAIRMAN. It is a little bit of a rivulet, is it not?

Mr. MORISON. It is not a very large stream, but a good deal of water must come down it in the wet seasons. There is enough water entering Lake Bohio between Obispo, where the canal leaves it, and Bohio, where the dam would be, to make the discharge of the Chagres at Bohio from one-third to one-half more than it is at Obispo. In other words, the flow of the streams which enter the Chagres in the limits of the lake would be something like one-half the flow of the whole river where it enters the lake from above.

Senator HANNA. You spoke this morning about the Bohio Dam, and it is not necessary to repeat, but testimony has been given here that the silt from the Chagres River would, within probably a space of twenty years, fill up that dam.

Mr. MORISON. I do not think there is any possibility of that. The Chagres River rises in the mountains where there are no signs of any silt. The banks of the river above the site of the Alhajuela Dam are rocky, with some very coarse gravel, like a mountain stream which carries no silt. Below that point you find the first signs of silt. There is silt in the banks of the river 10 miles below Alhajuela, and from there down it increases. So long as the river runs as it does now it will wash those silt banks and carry them down and move about more or less silt; that is, in times of high water. If, however, you build a dam across that river and convert it into a lake, you stop the current that washes the silt, and that silt remains practically undisturbed in the bottom of the lake, and the only silt brought into the lake will be the infinitesimal amount which is brought by the mountain stream above those limits. That is one reason why I prefer the Commission's plan, which puts the level at 85 feet, rather than a lower one, because it will flood the valley of the Chagres up to the upper limits of any silt banks.

The CHAIRMAN. What would the distance be from the present dam site?

Mr. MORISON. Something over 20 miles.

Senator HANNA. Slack water?

Mr. MORISON. Yes, sir.

Senator HANNA. When the dam is finished?

Mr. MORISON. Yes; but the upper 7 are not in the line of the canal; it is an extension where steamboats—little boats—can go for bananas or something of that kind, but it will not be on the route of deep-water navigation.

Senator HANNA. Then in your judgment that danger of filling up the lake from deposits from the river would be little?

Mr. MORISON. I do not consider that it amounts to anything. That is one of the functions of lakes; they are settling basins. You never find a river that runs out of a lake which carries with it much silt.

Senator KITTREDGE. What about the cost of the maintenance and operation of the Panama Canal as compared with the other?

Mr. MORISON. Our Commission made an estimate by figuring out the number of dredges that would probably be needed and the force of men probably required, and it came to \$2,000,000 for the Panama Canal and about \$3,300,000 for Nicaragua. Each canal has got to keep a certain staff independent of that which actually handles the

material. I think that probably that is as fair an estimate as can be made.

Senator HANNA. Testimony has been given here by a naval officer who is not an engineer, but who had been on the isthmus on a pleasure trip, I believe, to the effect that there were 3 or 4 miles or 5 miles of the bed of the canal where, at a depth of about 8 feet from the surface, they had struck a volcanic formation of rock, spongy and porous, upon which the explosion of dynamite had no effect, and that in order to deepen that to the required depth of 35 feet for the canal they would have to build a cofferdam and pump the water out, and then cut that material out with some machinery, the same as you would cut anything that could be cut by steel. Do you know of any such place?

Mr. MORISON. I don't know of any such place. Around Colon Harbor the bottom rock is a coral rock, which is—I am not sure but what it would be a bad rock to blast. On the other hand, it would be a comparatively easy rock to work in other ways.

That class of material is found wherever you have lava; that is, you are liable to have a porous lava. There is a great deal of it in Arizona, in which powder seems to find a side vent through fissures. There may be some at Panama, although I do not know of it.

Senator HANNA. If there had been conditions such as I have described, which would cause the engineers in charge to abandon the work until such time as they could construct a cofferdam, you probably would have heard of it?

Mr. MORISON. I think so. I think that class of material is much more likely to be found in Nicaragua than in Panama, for the reason that the Nicaragua country contains a great deal more signs of volcanic activity, and that class of rock is such as comes from recent volcanos.

Senator HANNA. With reference to Culebra cut, you have stated this morning that it is only a question of magnitude, and not of physical or engineering difficulty, and you now say that with modern machinery you think that work could be carried on more rapidly than it has been up to the present time. What have you to say with reference to the drainage of that cut? Is that provided for? I understand this material through which that cut is made is hard clay, almost approaching the tenacity of rock, but that it washes or dissolves in water or in contact with water.

Mr. MORISON. I do not think that amounts to anything. It is a clay; it is a hard clay; it does weather; it would weather very rapidly in a northern climate where we have frost. In that climate it weathers, but I think it will weather very slowly. The appearance of the slopes of the cut as far as it has been taken out indicates this. The only thing that gives any doubt of the stability of that material is that if you take a small piece of it and drop it into a glass of water it very soon falls into a powder, and that is a very curious thing. I picked out a piece of that stuff myself from a point 60 feet below their excavations. I went down in a bucket into a test pit. That pit had been full of water for a year, and they had just pumped it out, and I took out a piece of clay and it seemed to be in fair condition. I brought it to Colon and put it in water and it fell to pieces just as the others did. Now, that our estimates have provided for. We have provided for a heavy retaining wall the entire length of that Culebra cut on each side.

Senator HARRIS. That is on each side of the canal, and not of the cut.

Mr. MORISON. No, sir; not of the cut. The greater portion of it is under water. We have estimated more than \$9,000,000 for that wall. There are the exact figures [referring to a table], those two added, before the 20 per cent is put on. This is one of the things that make me feel that our estimate for the Panama route is much more liberal than our estimate for Nicaragua, for if we had had only borings of the cut, and had not seen the actual material in it, we should never have thought of putting it in.

Senator HANNA. From any superficial examination?

Mr. MORISON. Yes, sir.

The CHAIRMAN. How far below the bottom of the canal does that wall go?

Mr. MORISON. Only about 3 feet below the bottom of the canal. It reaches from the bottom of the canal about 5 feet above the highest water in the canal.

The CHAIRMAN. That is to say, it reaches from 3 feet below the bottom of the canal up to the distance you stated above high water?

Mr. MORISON. Yes; and then the slopes are estimated on the basis that they come down to the bottom of the canal. Now, that leaves a bench 50 feet wide on each side, on the level at the top of that wall, so that any material that may fall down from the slope has a bench 50 feet wide to land on.

Senator HARRIS. Is it not 35 feet? That was mentioned as the basis of that berme.

Mr. MORISON. It is possible that I am wrong. One of our plans was 50 feet. It probably would be 50 feet actually, because we should probably not take out the canal with a flat slope, but with a series of benches—steeper intermediate slopes.

Senator HARRIS. The general slope, I believe, is considered to be one to one.

Mr. MORISON. It is estimated as exactly one to one, terminating at the bottom of the canal.

Senator HARRIS. Do you think that clay, with the rainfall and its inclination to disintegrate, is safe at a slope of one to one?

Mr. MORISON. Yes; I think if the cut was only 50 feet deep, it would be safe almost vertical.

Senator HARRIS. Here the practice ordinarily in earth cuts, railroad cuts, it is about one and one-half to one.

Mr. MORISON. That depends on the quality of the soil. It is generally one to one. In many parts of the West it is one-half to one, and in many parts of the South it is as low as one-quarter to one. But here you have the worst possible conditions, because we have a maximum amount of freezing and thawing.

Senator HANNA. In the north, you mean?

Mr. MORISON. We have it worst right here in Washington.

Senator HANNA. I mean in this latitude. You have made no provision for surface water, keeping it out of the cut?

Mr. MORISON. That does not require any particular estimate. It is simply a matter of care in depositing the spoil banks. They have to be so deposited that they do not hold water behind them. That has not always been done in the French management, but it can be done.

The CHAIRMAN. Do those slopes in the Culebra and the Emperor cuts readily cover themselves with vegetation?

Mr. MORISON. They have not much. It seems to be a very hard material—too hard for vegetation to grow on readily.

Senator HANNA. From the cut west to the Pacific Ocean are there any physical conditions there that need special attention?

Mr. MORISON. Nothing unusual. There is a long channel out into Panama Bay. It is somewhat the same class of work as in Mobile Bay, only it is not so long; it is not more than a quarter as long.

The CHAIRMAN. There is no coral in Mobile Bay?

Mr. MORISON. There is no coral in Panama Bay. It is at Colon that the coral is found. There is coral in the approach to the bay, but not where the harbor channel is. There is coral between La Boca and the first lock, but not where the harbor channel is.

Senator HANNA. That is in the shore?

Mr. MORISON. Yes, sir.

Senator HANNA. But not out to sea?

Mr. MORISON. No, sir. The steamers that now enter Panama Bay are perfectly willing to ground.

Senator HANNA. But they anchor out 4 miles?

Mr. MORISON. Well, this channel would be in the same kind of a region.

Senator HARRIS. But under the coating of mud there still might be coral. It has been testified that this excavation will require considerable excavation of coral.

Mr. MORISON. There is some excavation of coral rock inside of low-water shore line in Panama Bay. I don't think there is anything outside.

Senator HANNA. I think it was Mr. Haupt that gave that information to the committee. Was he there with you?

Mr. MORISON. No; he did not go to the Isthmus with the Commission. He had been down there before, but he did not go with the Commission.

Senator HANNA. Had he been there as a member of a former Commission?

Mr. MORISON. He had been there as a member of the Nicaragua Commission. He had been to Nicaragua, and they also went to Panama.

Senator HANNA. Why did they go to Panama?

Mr. MORISON. I was not a member of the Commission and I do not know.

The CHAIRMAN. That is the Commission of which Admiral Walker was the president?

Mr. MORISON. Yes; they spent some time in Nicaragua and returned by way of Colon, and while there they went over the route of the canal.

Senator HANNA. But Mr. Haupt was not on the Isthmus at either the Panama or the Nicaragua line in the last Commission?

Mr. MORISON. No, sir. The channel now from deep water in to the mouth of the canal at La Boca is deep enough to take any ship that would ever want to use the canal at high water. It is not deep enough to do it at low water.

Senator HANNA. At mean tide how would it be?

Mr. MORISON. At mean tide I think it might do, although the channel is not quite what would be wanted for mean tide. In fact, in my judgment, it would be an unwise expenditure to deepen that channel to 35 feet below low water, but that is the estimate of the Commission. That will give 45 feet at mean tide and 55 feet at high tide. Those are conditions which have never been made at any ports that I know of anywhere in the world where they have that range of tide. They consider it justifiable to take advantage of the tide to get in. Now

ships can enter Liverpool Harbor, that is, they can go over the mouth of the Mersey at low water, but they can not dock without about two-thirds tide.

Senator HANNA. With reference to the curvatures on the Panama route, testimony has been given here that there is one curve in the harbor of Colon which is at a sharper angle than that of any other on either route. Do you consider that as proposed to be constructed, with 500 or 600 or 800 feet wide at the bottom, that it is any disadvantage in the operation of vessels?

Mr. MORISON. A vessel must go slow to go around it. That curve comes at just the place where any ship entering the canal will have to stop to be entered and pay her tolls and other things of that kind. She will probably stop before she goes around that curve and have something to help her around it.

Senator HANNA. Then from that until she enters the Pacific the curvature is very easy?

Mr. MORISON. Yes; it is easier than in any canal of importance in the world.

Senator HANNA. Easier than any in the world?

Mr. MORISON. I think so. The matter of a curve is a very different thing according to its location. On the Suez Canal they formerly had, and I think they still have, an extremely sharp curve.

Senator HARRIS. When you speak of the Panama being less than any other in the world, are not all of the curves, both on the Nicaragua and the others, easier than any other canal?

Mr. MORISON. I do not want to say that the Nicaragua is not; I can not say that it is. At a place on the Suez Canal the canal forms a sort of fan in this way, and a ship will come in here and then she would have that bay to back around into and then go on. It would be a very simple thing to change this curve that we are speaking of at Colon into a large triangular space. Probably that would be done.

Senator HANNA. By cutting off the point?

Mr. MORISON. Not by cutting off the point, but by cutting opposite the point. If you will give me a pencil and a piece of paper I will show you what it is. [Drawing diagram on paper.] Here is the outer bank, and the canal comes in here. This is widened out for a broad canal. Here is the harbor out here, and here is a place where the statue of Columbus stands. One reason for getting around there quick is that if you come around there this point at once becomes a shelter; but if you were to take cut corner out there a ship could come up here, pull up along there, and then whenever she is ready to go a tug could very quickly pull her bow around there and she would go right off. I do not think that is to be counted as a curvature in the canal.

Senator HANNA. Quite a feature has been made of the sanitary conditions along the route of the Panama Canal—that owing to the climate and other things there is a great deal of mortality. At the time you were there what were the conditions as compared with former years?

Mr. MORISON. We were there not a great while. There was yellow fever there when we were there. I do not think there was a great deal.

Senator HANNA. I mean as applied more particularly to the working force along the whole route.

Mr. MORISON. I don't think there was much sickness among the men along the whole district.

Senator HANNA. In the early days there was a great deal.

Mr. MORISON. I think the diseases at Panama are very largely due to artificial conditions. The Isthmus of Panama has always been an unhealthy place. It has been inhabited for four hundred years, and I think you may say that there is not a water pipe or a sewer on the whole Isthmus. The city of Panama has never had so bad a reputation for sickness as Santiago de Cuba, and we know what has been done at Santiago de Cuba. I think that we know now how to handle sanitary conditions at Panama.

Senator HANNA. Well, that is in the city of Panama; but the evidence was furnished here that out of a working force of 400 men—I have forgotten now the length of time they were at work—when they left there only 10 ever reached this country alive.

Mr. MORISON. Well?

Senator HANNA. About 400 were taken out there, and they all died off but about 20 or 30, and most of them died before they got back.

Mr. MORISON. Well, that is perfectly possible in time of yellow-fever epidemic. The first thing to do on the Isthmus is to get a supply of good water. There is plenty of good water on the Isthmus, but the people do not have it; and the next thing is to dispose of their sewerage. With those two conditions met, three-fourths of the sickness on the Isthmus will disappear.

Senator HANNA. The French company had studied all those conditions before they made any preparations to avoid these troubles.

Mr. MORISON. I can not say that they have studied them very much. You see they abandoned their work there ten years ago, and the advance in sanitary matters in the last ten years has exceeded what it was in the previous fifty years.

Senator HARRIS. It will be necessary not only to take care of the health of the employees right along the line, but the health of the city of Panama itself has to be looked after.

Mr. MORISON. Certainly; that is absolutely necessary.

Senator HARRIS. It becomes a radiating center of disease otherwise?

Mr. MORISON. The city of Panama must be treated in the same way as Habana. The whole Isthmus must be treated in that way.

Senator HANNA. In a malarial country like that, is it not true that a good deal of sickness in the nature of fevers comes from the breaking up and disturbing of primitive soil?

Mr. MORISON. That has always been the theory, and I think that it is probably correct. The Panama Railroad Company makes it a rule with their white employees to give them two months' furlough every year—one month at full pay and one month without pay—and to give them transportation between New York and Colon back and forth, they paying their own board on the ship. With that provision they do not seem to have any special difficulty with the health of their men.

Senator HARRIS. The Commission make no estimate whatever as to the sanitation of Panama and Colon?

Mr. MORISON. Not in detail. That is one of the things which is included in the 20 per cent, and it is my own judgment that the sanitation of the Isthmus of Panama involves much less untried work than the sanitation of the swamps of Nicaragua. In fact, our experience in Cuba has been of enormous value in showing what could be done at Panama. I can not say that it has been of value in teaching us how to handle swamps.

Senator HARRIS. Well, swamps will not produce yellow fever.

Mr. MORISON. If the last reports are correct, we can get rid of yellow fever by killing the mosquitoes. The swamps will produce fevers that are worse than yellow fever.

Senator HANNA. Then, summing up the proposition of the Panama Canal route, there are to your mind no physical difficulties that are insurmountable or approaching that, and no engineering difficulties but what can be easily overcome?

Mr. MORISON. Well, which it is perfectly practical to overcome.

Senator HANNA. That is better. In view of those facts, do you consider the price at which this property is offered to us a reasonable price?

Mr. MORISON. Yes; I do.

Senator HANNA. Do you consider it a low price?

Mr. MORISON. I consider it a very fair price. That price represents, as near as we could estimate it, what would have to be expended now, if nothing had been done in the Isthmus, to put the Isthmus in such condition that the cost of the completing of the canal would be what it is now.

Senator HANNA. When that proposition was made by the new company I understand that it did not embrace a great deal of machinery, in the way of locomotives and other machinery there, that has since been added to the scrap pile which we buy.

Mr. MORISON. Yes. I would not give anything for any of the machinery down there.

Senator HANNA. Because you could get better?

Mr. MORISON. Because it is twenty years old. You can not afford to use it. The locomotives are too small; they have not more than half the power they ought to have, and there are a great many machines there that nobody has ever discovered the use of.

Senator HANNA. You say that Mr. Haupt was not on the Isthmus. What work was assigned to him as his work on the Commission?

Mr. MORISON. He was a member of what we call the committee on value of the canal. He attended all of the meetings, or nearly all of them, when they were held in Washington, and followed up a good many subjects, but I do not know why he did not go to the Isthmus.

Senator HANNA. Have you ever been over the route of the Nicaragua Canal?

Mr. MORISON. Yes; the whole of it.

Senator HANNA. How long a time did you spend?

Mr. MORISON. I went with the Commission. We were about a month going over it.

The CHAIRMAN. Did you go through those swamps that we have been talking about?

Mr. MORISON. Yes; I did not go through, but went into them and saw a good deal of them. Men who were on the lines went through them. You can only go through them in boats, and by occasionally wading.

The CHAIRMAN. Did the engineers have boats?

Mr. MORISON. Yes; nobody could go through those swamps in any other way.

The CHAIRMAN. How many lines have been run through there?

Mr. MORISON. I could not tell you.

The CHAIRMAN. Quite a number?

Mr. MORISON. Yes; some of them were run by the present Commission and some by the preceding Commission.

The CHAIRMAN. Well, beginning as far back as Childs's lines upon lines that have been run through there?

Mr. MORISON. Yes; Colonel Childs was the first man to make a good survey of the Nicaragua route, and I believe that at the time Mr. Childs made that survey the Nicaragua route was probably the best route. At that time he made the statement, I think, that there were only 15 ships in existence that drew 17 feet, and his plans were made for a canal 17 feet deep. He then made a further estimate for a canal 12 feet deep. What he proposed was a system of slack-water navigation of the San Juan River which was very attractive.

The CHAIRMAN. That was a dam at every rapid?

Mr. MORISON. A dam which would submerge every rapid. That made the canal a very attractive thing, for if you improve the navigation of the San Juan a vessel could go up the river and across the lake to within about 12 miles of the Pacific. It seemed as if all that had to be done was to build a canal about 17 miles long to connect the lake with the Pacific.

The dams which would make slack-water navigation would have to be founded on sand for the lower half of the river. The river is 100 miles long, and it is 100 feet higher at one end than it is at the other. That tells the story to an engineer. No river can fall a foot in a mile without having a great many obstructions, and in the lower half of that river, below the San Carlos, these obstructions are all sand bars. It was Colonel Childs's scheme to put in a series of low dams and a series of locks of low lift, and in that way get slack-water navigation—the same thing that had been in many of the rivers of this country, though it is nearly all abandoned now.

The CHAIRMAN. He ran his line into Greytown?

Mr. MORISON. Yes, sir.

The CHAIRMAN. He did not run it out to the mouth of the San Carlos?

Mr. MORISON. At that time the largest channel of the San Juan was the one that bears that name. The Colorado is the largest now.

The CHAIRMAN. Did he channelize at all except on the other side of the lake? Did he have any actual canals dug?

Mr. MORISON. Yes; there was a canal under his plan through the low country.

The CHAIRMAN. Through these very bottoms that you are talking about now?

Mr. MORISON. Yes, sir.

The CHAIRMAN. How long was that?

Mr. MORISON. I can not tell you; it is in the report.

The CHAIRMAN. Was it not as much as 18 miles?

Mr. MORISON. It may have been.

The CHAIRMAN. That was a practicable canal for ships of that size?

Mr. MORISON. I think so.

The CHAIRMAN. Could you put such a canal as that between Panama and Colon, across the Culebra Hills and keep it supplied with water?

Mr. MORISON. Well, it would depend upon how high you went up. I do not know that you could unless you pumped the water. You could not have gone up any great height without pumping your water.

The CHAIRMAN. That is what I mean.

Mr. MORISON. And that was a sufficient reason for adopting Nica-

ragua at that time, but with the increased draft of ships and the increased depth required in a canal the whole thing was changed. I think the first confession of that came from Mr. Monocal, when he decided to abandon the Lower San Juan entirely, to build a dam at Ochoa, and to extend the level of Lake Nicaragua into a side basin until he got pretty near to the sea.

The CHAIRMAN. He would save about 13 miles on the lines that he laid down.

Mr. MORISON. Yes; his line would be an ideal line if it could be built.

The CHAIRMAN. That was not a confession, but it was the adoption of a shorter line.

Mr. MORGAN. I think it was a confession that he could not improve the San Juan River, that you have got to abandon the San Juan River instead of following it down.

The CHAIRMAN. Do you remember any statement of Mr. Menocal to the effect that he could not carry the canal through?

Mr. MORISON. No; I do not know that he made one.

The CHAIRMAN. When he makes a statement to the reverse, you would not consider that he had confessed that he could not do it?

Mr. MORISON. It depends upon what meaning you take. He certainly considered that the other thing was better.

The CHAIRMAN. There is no doubt about that.

Senator HANNA. Was that the line adopted by what was known as the Maritime Canal Company?

Mr. MORISON. Yes; the difficulties of that were extreme. Their dam across the San Juan was at Ochoa; the Ochoa Dam had to be founded in sand, and had to be founded in the current of the river, for there was no means of diverting the river anywhere else. Furthermore, the dam was not the whole difficulty; the summit level had to be maintained by a long series of embankments. Each successive examination has led to an improvement in the line between the San Juan River and the sea. I think the line adopted by the present Commission is very decidedly better than any of the others, but when it is done it involves a continuous canal from the ocean at Greytown to the entrance of the San Juan.

The CHAIRMAN. To Conchuda?

Mr. MORISON. Yes; to the San Juan above Conchuda, which is as long as the entire Panama Canal and is a canal all the way without any relief from lakes or anything of that kind; it is a canal for the whole distance.

The CHAIRMAN. That is the canal that you have adopted?

Mr. MORISON. Yes.

The CHAIRMAN. And recommended to the Government?

Mr. MORISON. That is the one that we considered the best location in Nicaragua.

The CHAIRMAN. I am not asking what Mr. Menocal's judgment was, or his hopes for the future. You considered his routes impracticable from an engineering standpoint?

Mr. MORISON. Yes; both from an engineering standpoint and a military standpoint, because it could be very easily destroyed.

There is one thing that I have never seen mentioned. It may amount to something and it may not. A ship could enter the Nicaragua canal at Brito, and after it had entered it a foreign fleet could sail from the dockyard at Kingston and reach the Greytown end of the

canal before that ship got through the canal. It could not do it at Panama.

The CHAIRMAN. If that is so, having a foreign vessel hostile to the United States, if one was to enter upon the Pacific side of that canal could not a ship sail from Key West or Habana before the ship could get through?

Mr. MORISON. No, sir.

The CHAIRMAN. What would be the difference in the distance?

Mr. MORISON. You can not do it. We can just do it from Kingston, Jamaica. Jamaica is pretty well situated to get at the Isthmus.

Senator HANNA. The Commission in their report state that the cost of operation and maintenance, respectively, of the two routes in Nicaragua and Panama is in Nicaragua \$1,300,000 more than at Panama. Is that your judgment?

Mr. MORISON. Yes.

Senator HANNA. That is the interest on \$65,000,000, Government rate?

The CHAIRMAN. What was Mr. Childs's estimate of the cost of his canal?

Mr. MORISON. I should have to look that up.

The CHAIRMAN. It was about \$25,000,000, was it not?

Mr. MORISON. I think it is all in our report. I would rather refer to that report than to give it without reference.

Senator HANNA. How do you regard the dangers of navigation, which would have to be covered by insurance, between the two routes?

Mr. MORISON. I think they would be about in proportion to the length of the route; that is the additional premium to be paid over what it would be if it was the same distance of deep-sea sailing.

Senator HANNA. Mr. Haupt made a calculation, which was interesting to say the least, to overcome that difference in the cost of operation, which would reduce it to \$900,000 as compared with your \$1,300,000, the time to be saved from ports of New York, or from a port on the Atlantic, to ports on the Pacific, to San Francisco, of one day, and from ports on the Gulf of Mexico to San Francisco, two days. He stated that the saving of time and expense to a vessel would overcome the difference in the cost of the operation of the canal. I want to bring out the fact that he placed the cost of operation between the two routes \$400,000 less than the Commission did. Do you know whether that part of the work was assigned to him?

Mr. MORISON. That part of the work was assigned to a special committee, consisting of General Ernst, Mr. Noble, and myself, and the work was done very largely by General Ernst.

The CHAIRMAN. You mean the estimates of maintenance?

Mr. MORISON. Yes.

The CHAIRMAN. I would be very glad if you can give the items of maintenance on both routes.

Mr. MORISON. Well, it is a long matter, and I have not the figures of it here. I could furnish you with a copy of the draft.

The CHAIRMAN. I would be glad to get it.

Mr. MORISON. I understand that General Ernst is to appear before this committee, and as he was the man who did the greater part of that work, I should a little rather have it furnished by him than by myself.

The CHAIRMAN. Well, I will get it from him. I want to get it in the record if I can. I have never seen it.

Mr. MORISON. Each member of the committee has it and I think very likely each member of the Commission. The greatest advantage of the Nicaragua Canal—I think I may say that it is the only advantage it has—is that its west end is 500 miles nearer San Francisco than the west end of the Panama Canal. That means that a slow steamer, the class that usually carry freight, running night and day through the Nicaragua Canal, would get to San Francisco in one day less time than she would if she went through the Panama Canal. If, however, she did not run day and night, but tied up during the night, running only during the day, she would get to San Francisco in the same time by both routes.

The CHAIRMAN. You spoke of the Suez Canal. Is not that navigated at night?

Mr. MORISON. Yes.

The CHAIRMAN. How do they manage to do it?

Mr. MORISON. You can navigate canals at night. If you will let me finish my answer I will take up this subject afterwards. If, however, you consider very high-powered ships, a fast modern ship would get to San Francisco just as quick through one route as through the other; and she would get there a day quicker by way of Panama than she would if she laid up nights on the Nicaragua route.

Now, Mr. Chairman, the Suez Canal is carefully lighted, and no ships are allowed to run at night unless they have a particular system of electric lights.

The CHAIRMAN. The ship itself?

Mr. MORISON. The ship itself. Furthermore, you probably can not find a more perfect climate in which to run at night. That is the climate of the Suez; it is the climate of Egypt, which we all know is practically a rainless climate and the nights are very clear; further, it is a canal with soft banks, and if a steamer strikes the banks it does not hurt her.

Senator HANNA. With reference to the general saving of time in the commerce of the world, ships coming from Europe, any port of Europe, the Mediterranean, or anywhere else, and going to Australia, or the west coast of South America, would there be any advantage in the Nicaragua over the Panama route?

Mr. MORISON. Some time ago I tried to study that matter up myself, and if you will permit me I will read you this paper which I have prepared.

Senator HANNA. We should be very glad to have you do it.

Mr. MORISON. I want it distinctly understood that all of these estimates are based upon the assumption that the ship while going through the Nicaragua Canal runs day and night. The paper is as follows:

“New York may be taken as the representative of all North American Atlantic ports; the course from all these ports to either Colon or Greytown would be around Cape Maysi, the eastern end of Cuba.

“New Orleans may be taken as the representative Gulf port, the course from there to either Panama or Greytown being through the Yucatan Channel.

“Plymouth, England, may be taken as the representative of all European ports, and it may be assumed that the course from any European port to either Colon or Greytown would be by way of St. Thomas, stopping there for coal. If another coaling station is used it will make no very material difference.

“The distances from these several ports to Colon and Greytown are as follows:

TABLE I.

Port.	To—		Differ- ence in favor of Colon.
	Colon.	Grey- town.	
	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
New York.....	1,965	2,025	60
New Orleans.....	1,400	1,260	—140
Plymouth.....	4,495	4,665	170
Average.....			30

“The distance from New York is calculated from Sandy Hook. Gibraltar, which would represent all Mediterranean ports, is 222 miles nearer St. Thomas than Plymouth is, but the difference will be constant.

“The time required to pass through the Panama Canal is approximately equal to the time required for a steamer to travel 150 miles at sea. The time required to pass through the Nicaragua Canal is approximately equal to the time required for a steamer to travel 400 miles at sea. These distances correspond to a speed of 12 miles an hour at sea; they represent an advantage of 250 miles in favor of Panama; with a speed of 10 miles per hour this difference would be reduced to 208 miles; with a speed of 15 miles per hour it would be increased to 312 miles; to avoid unnecessary complications they are considered a fair mean for all conditions. If we add these distances to those given above we have the practical distances from the three representative ports to the Pacific termini of the two canals, as follows:

TABLE II.

Port.	To—		Differ- ence in favor of Panama.
	Panama.	Brito.	
	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
New York.....	2,115	2,424	310
New Orleans.....	1,550	1,660	110
Plymouth.....	4,645	5,065	420
Average.....			280

“In general it may be said that it will take about a day longer in the average of all voyages for steamers to reach the western terminus of the Nicaragua Canal than to reach the western terminus of the Panama Canal.

“On the Pacific there will be three classes of traffic; that going to San Francisco and all Northern Pacific ports, including those of Asia; that going to South American ports; that going to South Pacific ports, as in New Zealand and Australia.

“Yokohama may be considered the first port that will be made by steamers going to either Japan or China. In order to make a coaling point voyages would be made either by way of San Francisco or of Honolulu. Of these routes that by way of San Francisco is 1,500 miles the shorter. For these reasons the port of San Francisco may be considered as representing not only California traffic, but all traffic for China and Japan.

“Manila, which may be taken as the representative port of the Philippines, is 200 miles farther from Brito by way of Honolulu than by way of San Francisco, and 186 miles farther from Panama by way of Honolulu than by way of San Francisco. The relative difference is really very slight, and the two routes may be considered as practically of equal length.

“San Francisco is 3,179 miles from Panama and 2,636 miles from Brito, a difference of 543 miles in favor of Brito. Combining these distances with those given in Table II, we have the through distances to San Francisco by way of the two canals, as follows:

TABLE III.

	Via Panama.	Via Nicaragua.	Difference in favor of Nicaragua.
	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
San Francisco from—			
New York.....	5,294	5,061	233
New Orleans.....	4,729	4,296	433
Plymouth.....	7,824	7,701	123
Average.....			263

“On San Francisco business it may be said that the Nicaragua route has an advantage in time from sixteen to twenty-four hours.

“Another possible route across the Pacific is by way of Honolulu. Although this is a longer route to all trans-Pacific points, special local considerations will lead some vessels to take it. Honolulu is 4,681 miles from Panama and 4,150 miles from Brito, a difference of 531 miles in favor of Brito. Combining these distances with those given in Table II, we have the through distances to Honolulu by way of the two canals, as follows:

TABLE IV.

	Via Panama.	Via Nica- ragua.	Differ- ence in favor of Nica- ragua.
	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
Honolulu from—			
New York.....	6,796	6,575	221
New Orleans.....	6,231	5,810	421
Plymouth.....	9,326	9,215	111
Average.....			251

“There is practically no difference in the relative distances by the two canals whether the route to Asia be taken by San Francisco or by Honolulu. The fact that Honolulu lies almost exactly half way between the Isthmus and Manila indicates that this may be a favorite route to the Philippines in spite of its slightly greater length.

“The greater part of the traffic with the west coast of South America will pass around Cape Blanco, which may be taken as a governing point for all this traffic. Cape Blanco is 813 miles from Panama and 975 miles from Nicaragua, a difference of 162 miles in favor of Panama. Combining these distances with those given in Table II,

we have the through distances to Cape Blanco by way of the two canals as follows:

TABLE V.

	Via Panama.	Via Nica- ragua.	Differ- ence in favor of Panama.
Cape Blanco from—	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
New York	2,928	3,400	472
New Orleans	2,363	2,635	272
Plymouth	5,462	6,040	582
Average			442

“On west coast South American business, it may be said that the Panama route has an advantage in time of from twenty-eight to forty-two hours.

“The only other distances which it is expedient to consider are those to New Zealand and Australia. Wellington is selected as the New Zealand port and Sidney as the Australian port, this being the most westerly important port of that island. Wellington is 6,485 miles from Panama and 6,280 miles from Brito, a difference of 205 miles in favor of Brito. Combining these distances with those given in Table II, we have the through distances to Wellington by way of the two canals as follows:

TABLE VI.

	Via Panama.	Via Nicara- gua.	Differ- ence in favor of Panama.
Wellington from—	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
New York	8,600	8,705	105
New Orleans	8,035	7,940	—95
Plymouth	11,130	11,345	215
Average			75

“Sidney is 7,669 miles from Panama and 7,410 miles from Brito, a difference of 259 miles in favor of Brito. Combining these distances with those given in Table II, we have the through distances to Sidney by way of the two canals as follows:

TABLE VII.

	Via Panama.	Via Nicara- gua.	Differ- ence in favor of Panama.
Sidney from—	<i>Miles.</i>	<i>Miles.</i>	<i>Miles.</i>
New York	9,784	9,835	49
New Orleans	9,219	9,070	—149
Plymouth	12,314	12,475	161
Average			20

“New Zealand is the only eastern place which can be reached more directly from Plymouth by way of the American Isthmus than by way

of the Suez Canal, but the distances to both Sidney and Wellington by the two routes (Panama and Suez) do not differ enough to determine the direction of the traffic. For Australian and New Zealand commerce the Panama and Nicaragua routes are equally convenient.

“Summarizing the preceding tables we find that San Francisco represents practically everything on the Pacific Ocean north of the equator and that to reach San Francisco the Nicaragua route has an advantage over the Panama route equivalent to 263 miles. For business with west coast of South America the Panama route has an average advantage of 442 miles. For business to points beyond the Pacific and south of the equator, which virtually consists of New Zealand and Australia, the Panama route has a slight advantage, but the advantage is so small and other routes are so feasible that this has no practical influence on the relative merits of the two schemes.”

I then went beyond this in another study and tried to assign proportions to the different classes of traffic. This was an assumption of my own, and it can not be very accurate, because, as I have sometimes said, I know of nothing in which statistics are of as little value as are statistics about transportation before that transportation has come into existence. I will proceed:

“The previous studies have been based on a few terminal points without giving special consideration to the relative amount of traffic by the several routes; a further study should be made on this basis. The amount of traffic between the Atlantic and the Pacific ports of the United States will be regulated by various other conditions, especially interior transportation and the action of the transcontinental railroads. It seems approximately right to assume, however, that the trade of the United States Atlantic ports will be double that of the Gulf ports; that the trade of either Atlantic or Gulf ports with the regions represented by San Francisco, which includes Asia, will be double that of either of these with the west coast of South America; that the trade of European ports and of the Gulf ports with San Francisco and other west coast United States ports will be equal; that the trade of European ports with west coast ports of North and South America will be equal.

“Combining these figures and making the trade between Gulf ports and South American west coast ports the unit, we have the following relative amounts of the several lines of transportation. As before stated, New York represents the Atlantic United States ports, New Orleans the Gulf ports, Plymouth the European ports, San Francisco the North Pacific ports, and Cape Blanco the South American Pacific ports:

New York to San Francisco	4
New York to Cape Blanco	2
New Orleans to San Francisco	2
New Orleans to Cape Blanco	1
Plymouth to San Francisco	2
Plymouth to Cape Blanco	2
Total	13

“Of these all but the last represent traffic with the United States.

“To compare the relative distances by the two canals each of these numbers must be multiplied by the difference in favor of Panama or

Nicaragua, as given in Tables III and IV. If this is done we have the following results:

TABLE VIII.

	In favor of Pan- ama.	In favor of Nica- ragua.
New York to San Francisco, 4 by 233		932
New York to Cape Blanco, 2 by 472	944	.....
New Orleans to San Francisco, 2 by 433		866
New Orleans to Cape Blanco, 1 by 272	272	.....
Plymouth to San Francisco, 2 by 133		246
Plymouth to Cape Blanco, 2 by 582	1,164	.....
	2,370	2,040

“This gives an average difference of 27 miles in favor of Panama.

“If we eliminate the last item as a traffic in which the United States has no interest, the average difference becomes 75 miles in favor of Nicaragua.

“These differences are so small as practically to put the two canals on an equality.

“All the above is on the assumption of the passage of each canal without delay for darkness or other interruptions.

The only conclusion that I can draw from all this is that there is practically no advantage in one route over the other.

The CHAIRMAN. If I get the statement correctly that you made, it is 500 miles on the Pacific side between Panama exit of the canal and Nicaragua.

Mr. MORISON. Five hundred and forty-three.

The CHAIRMAN. Then, if we want to shorten our coastwise line of trade, we would gain that distance by going through Nicaragua?

Mr. MORISON. You would gain that on the Pacific Ocean, but you would lose it by the time of going through the canal.

The CHAIRMAN. Now, all of the estimates that you made, it occurs to me, are made for steamers?

Mr. MORISON. Yes.

The CHAIRMAN. You make no allowance for sailing ships at all?

Mr. MORISON. No, sir.

The CHAIRMAN. Why do you drop them off?

Mr. MORISON. Because I do not believe that any sailing vessels are going to take either of those routes. There are practically no sailing vessels going through the Suez canal. Sailing vessels have courses of their own, which, as a rule, go a long way from land. There are certain routes where they do very well, and others where they do not, but where you can take a short course with a steamer I do not know of any route where a sailing vessel could do it at all.

The CHAIRMAN. Then you think the sailing ships of the United States, both on the Pacific and the Atlantic, are doomed to pass through the Straits of Magellan?

Mr. MORISON. No, sir; no sailing ship ever goes through the Straits of Magellan. They go around Cape Horn or the Cape of Good Hope, depending on where they are going.

The CHAIRMAN. You think that is the future of the American sailing ship?

Mr. MORISON. Yes.

Senator HANNA. You do not mean to confine that to American sailing ships?

Mr. MORISON. No, sir. When a ship sails from San Francisco she sails southwest and goes away out into the Pacific Ocean, and then changes her course and proceeds toward Cape Horn.

The CHAIRMAN. But American sailing ships do sail in great numbers around the Cape of Good Hope?

Mr. MORISON. Yes.

The CHAIRMAN. Did you ascertain that that class of trade was increasing very much?

Mr. MORISON. No; I did not. Professor Johnson made the study about that.

Senator HANNA. From an economical standpoint, I know something of sailing ships and the commerce of the world. There has been an increase in sailing vessels, in the construction of them, a very few, but carrying very large cargoes. It would be a question of expense, of course, of economy, as to whether they could better afford to carry their cargos around with the extra time than they could afford to pay the tolls and the towing bills through the canal. If one was cheaper than the other they would go the cheaper way, provided the dangers and risks were not increased.

The CHAIRMAN. You have made no provisions in either canal for the advantage of sailing ships; you do not estimate that at all.

Mr. MORISON. No; I do not.

Senator HANNA. Well, the history of the transportation through the Suez Canal guided you to that conclusion because it is not used by sailing ships. That having the same relation with reference to the Cape of Good Hope that our canal would have with reference to Cape Horn, that would be a fair comparison?

Mr. MORISON. At present the grain from the Pacific coast is carried to Europe in sailing vessels. It is a four to five months' voyage; it is practically the only way that it can be taken to Europe without rehandling and various objectionable transfers.

Senator HANNA. Without a canal.

Mr. MORISON. I mean under present conditions. Then the present grain crop on the Pacific coast is handled in an entirely different way from what the Eastern grain crop is handled. That is due to the climate. The whole crop is sacked, and it is kept sacked in the fields until they are ready to ship it. With the canal done, a steamer would make the voyage from San Francisco to Liverpool, a 12-knot ship, in about twenty-five days.

Senator HANNA. Well, I entirely agree with that proposition in your original statement, that on the completion of the canal as a matter of cheap transportation and time considered, that steamers of 10 and 12 knots, of large burthen, would then drive the sailing vessels out of that grain trade, and I am strengthened in that opinion by the fact that on the Great Lakes there has not been a sailing ship built for years, and that all the coarse freights on the Great Lakes are now carried by steam vessels. Since we have got the 21-foot channel up there the size of the vessels on the lakes have increased, in my experience,

from 600 tons to 6,000 tons, which minimizes the expense of the cost of carrying them, so that a sailing vessel can not compete.

The CHAIRMAN. I will ask you now, Mr. Hanna, as you are making a statement about it, where do the steamers on the Great Lakes supply themselves with coal?

Senator HANNA. Everywhere where they load or unload their cargo.

The CHAIRMAN. But they do not have to transport coal to coaling stations in order to provide themselves on the trip?

Senator HANNA. Oh, yes; they do. There are coaling stations all along the Sault River. There are five there. There are coaling stations at the head of Lake Superior and at Milwaukee and at Chicago.

Senator MORGAN. Have the sailing ships disappeared from the lakes?

Senator HANNA. Yes; except those that were built years ago. There are none built now and there have been none building for years. A great many of them are turned into tow barges. All the sailing ships on the lakes are engaged in the lumber trade, and as they are lost or go out of use because of age they are neither rebuilt nor are new ones built in their place.

The CHAIRMAN. Why don't the steamers take the lumber?

Senator HANNA. They do; but sailing ships in existence, I say, that have been in the ore and other trades do not compete now at all.

The CHAIRMAN. Now, Mr. Morison, can you tell how the grain of the Pacific slope is now transported to the European markets, whether by sailing ships or steamers or railroad?

Mr. MORISON. Almost entirely by sailing vessels. Ten years ago I was in the habit of being on the Pacific coast a good deal. I have not been very much lately, but I think it has not changed.

The CHAIRMAN. They did not give up the sailing vessels for transportation of grain because it goes slow?

Mr. MORISON. It is an extremely long voyage, which would be a very difficult voyage for a steamer to make.

The CHAIRMAN. But they do not give it up and take the steamer in order to increase the speed of the voyage?

Mr. MORISON. No, sir.

The CHAIRMAN. They still adhere to the sailing ships.

Mr. MORISON. But that is an entirely different case.

The CHAIRMAN. That may be a different case, but it is the truth, isn't it?

Mr. MORISON. It is the truth; it is one of the few cases where sailing vessels have the advantage. There are certain routes in which sailing vessels can make almost as good time as steamers, where you get wind. If sailing vessels could go from Liverpool to New York as quickly as they can go from New York to Liverpool, I think they would still be carrying a large portion of the freight between New York and European ports.

The CHAIRMAN. They are carrying a large proportion of it now, are they not?

Mr. MORISON. No; but if sailing vessels could make the time westward that they can make eastward they would be still in the business.

The CHAIRMAN. That is owing to the winds?

Mr. MORISON. The winds and currents.

The CHAIRMAN. If you have any experience in it, the winds of the ocean are very permanent in their character, are they not?

Mr. MORISON. They are in certain latitudes, and in others they are not.

The CHAIRMAN. Take the trades.

Mr. MORISON. The trades can be relied on in certain latitudes, and that is one reason why sailing vessels have continued to this day in the commerce that goes around the Cape of Good Hope or around Cape Horn, in both of which routes they have to cross the Tropics twice.

The CHAIRMAN. Don't you think that availing themselves of that power they will still continue to spread their sails on the ocean?

Mr. MORISON. If they are going to cross the Tropics in that way.

The CHAIRMAN. You do not expect that sailing ships will stop because the steamship has got the run?

Mr. MORISON. No, not entirely; but as soon as they cease to have to cross the tropics twice, which would happen when the canal is built, as soon as they cease to do that, the advantage of the sailing vessel would disappear and the steamer would come right in.

The CHAIRMAN. Have you ever computed what proportion of the coastwise trade of the United States on the Pacific and the Atlantic coasts is done by sailing ships?

Mr. MORISON. No, sir. There is a special class of trade along the Atlantic coast done by sailing vessels largely. I do not think there is as much on the Pacific, but up to the present time the conditions have been very artificial conditions on the Pacific coast. Under our navigation laws it has been a pretty hard thing to get steam vessels for the coasting trade.

The CHAIRMAN. But all of these propositions to spend money for digging a canal at Panama or Nicaragua, according to the plan of the Isthmian Canal Commission, are made and established without reference to the use of sailing ships?

Mr. MORISON. They have not been considered as of sufficient importance to have much weight in the conclusion.

The CHAIRMAN. Very good. That is all I want to know.

Senator HANNA. You say they have not been considered?

Mr. MORISON. I say they have not been considered as having much weight. We considered them to the extent of deciding what weight was to be given to them.

Senator HANNA. Of course it is a very small percentage. I do not know of anything more that I care to ask.

Mr. MORISON. There is one thing that I would like to say before we go. I see that a previous witness has introduced a paper that I prepared on the subject of the Bohio dam. That paper was prepared with a view of bringing the matter before a collection of engineers for discussion, to see what criticisms could be made on what I considered a satisfactory solution of the dam problem at a very much less expense than the Commission's plan. It will be discussed at a meeting in New York on the 5th of next month. When I stated there that I considered the Commission's plan—I have not the paper here or I would give you the exact words—when I stated there that I considered that the Isthmian Canal Commission's plan involved very great difficulties, I certainly did not mean that it could not be done. My own judgment is that, if I was going to use a core wall, I should not put the core wall in by the use of the pneumatic process, but I should select a place where I should have to go deeper than 128 feet, and would use the method that has been used in sinking very deep foundations in the

rivers of India—that of dredging through wells. The paper was prepared for the purpose I have mentioned.

Senator HANNA. Of creating a discussion?

Mr. MORISON. It was prepared to bring forward the plan and have it discussed, and to get the opinions of engineers.

Senator HANNA. Is Mr. Menocal a member of the engineers' association?

Mr. MORISON. Yes. I noticed that Mr. Menocal criticises a portion of the estimate on the ground that the pneumatic work is put in at \$21.50 instead of \$29.50 a yard. The reason it is put at \$21.50 a yard is that the greatest depth is 60 feet instead of 128 feet, and I think that certainly justifies the reduction of \$8 a yard.

The CHAIRMAN. You have examined the blue prints with reference to the Bohio dam?

Mr. MORISON. Yes, sir; and I passed on that point as a member of the Panama Commission.

The CHAIRMAN. That involves something more than merely putting down a caisson.

Mr. MORISON. The caissons simply form the foundation of the core wall; that is all.

The CHAIRMAN. But the bottom of the river there, or the dam, is not uniform.

Mr. MORISON. Certainly not.

The CHAIRMAN. How do you supply the difference between one edge of the caisson and the other which is up a few feet higher?

Mr. MORISON. That is a perfectly simple thing. You fill it up with concrete or something of that order. I have done that again and again in bridge foundations.

The CHAIRMAN. So that one edge of the caisson would rest on the rock and the other on the concrete.

Mr. MORISON. Yes, sir.

The CHAIRMAN. That is your plan?

Mr. MORISON. That is their plan.

The CHAIRMAN. Do you approve of that plan?

Mr. MORISON. I have put in a lot of bridge piers that way, and it is perfectly legitimate.

The CHAIRMAN. I understood you to say a moment ago that if you had the building of the dam you would dredge it.

Mr. MORISON. If I had to build that kind of a dam with the core wall I should consider very carefully what was the best way to do it. I should remember my old teacher's instructions that if I had five minutes in which to solve a problem I had better spend three in deciding the best way; and my own present feeling is that the chances are I should find some way to do that without using the pneumatic process.

The CHAIRMAN. You do not approve in advance of that plan as being a sufficient plan?

Mr. MORISON. I think it is a plan for the purpose for which it is made; it is a plan that can be carried out in some way, and it is a plan which, so far as estimates are concerned, may certainly be considered to be at least as expensive as that on which the dam will be built.

Senator KITTREDGE. What did you say about ships using the Nicaragua Canal after dark?

Mr. MORISON. It can be done; it is a very bad climate, but it can

be done. My own belief is that large ships will not run at night, but that small ones will.

Senator KITTREDGE. How can you light it?

Mr. MORISON. You can light the banks, and every ship should be supplied with a special set of electric lights, and special instructions for the use of them.

Senator KITTREDGE. Would it not be necessary to have lights along the canal banks in addition to the lights that the ships would carry?

Mr. MORISON. Yes; there ought to be some, but that kind of buoy lights do not cost very much.

Senator HANNA. Gas buoys?

Mr. MORISON. Yes; they are not very expensive.

Senator HANNA. No; but they are very good; they are a great invention.

The committee then (at 4 o'clock p. m.) took a recess until Thursday, February 13, at 10.30 o'clock a. m.

STATEMENT

OF

COLONEL PETER C. HAINS,

CORPS OF ENGINEERS, U. S. ARMY,

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Thursday, February 13, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Hanna, and Mitchell. Also Senators Kittredge and Millard, members of the committee.

Col. PETER C. HAINS, Corps of Engineers, U. S. Army, appeared and was duly sworn by the chairman.

STATEMENT OF COL. PETER C. HAINS, CORPS OF ENGINEERS, U. S. ARMY.

The CHAIRMAN. Gentlemen, will any one of you undertake the examination of General Hains?

Senator HANNA. I will do so, if you wish me to.

The CHAIRMAN. All right.

Senator HANNA. General, you are a member of the Commission appointed to examine the routes for the canal on the Isthmus?

Colonel HAINS. Yes, sir.

Senator HANNA. How long have you been connected with that work?

Colonel HAINS. Altogether, about four and a half years.

Senator HANNA. Were you on the Walker Commission?

Colonel HAINS. I was on the Nicaragua Canal Commission.

Senator HANNA. We call it the Walker Commission.

Colonel HAINS. Admiral Walker was president of both commissions. Then I have been a member of the Isthmian Canal Commission. We call one the Nicaragua and the other the Isthmian. The Nicaragua Canal Commission was only directed to report on Nicaragua and nothing else.

Senator HANNA. I understood that. During the time that you have been connected with the two commissions you have been over both routes, both the Nicaragua and the Panama?

Colonel HAINS. Yes; I have been over each one of them twice.

Senator HANNA. I understood that you had the work subdivided. Which particular branch of the work were you connected with?

Colonel HAINS. On the Isthmian Canal Commission, I suppose you mean?

Senator HANNA. Yes.

Colonel HAINS. I was chairman of the committee on the Nicaragua route. The Commission had been divided up into committees, these committees to look into the special details of everything in connection with the Panama route, the Nicaragua route, and the outside routes and concessions, and there was another committee on statistics and commercial advantages and that sort of thing.

Senator HANNA. In the examination of the Nicaragua route, about how much time did you devote to that route at each of the examinations?

Colonel HAINS. When I was on the Nicaragua Canal Commission I think we spent nearly three months in Nicaragua. As a member of the Isthmian Canal Commission we spent, I think, something like six weeks.

Senator HANNA. On the Nicaragua route?

Colonel HAINS. On the Nicaragua route.

Senator HANNA. And how long on the Panama route?

Colonel HAINS. On the first visit I think we were on the Isthmus about five or six days, and on the last occasion, as a member of the Isthmian Canal Commission, we were there about two weeks.

Senator HANNA. The four or five days you spent on the Panama route you were there unofficially; that is, you were not instructed to make any examination at that time, so you did not go there with that purpose in view, of making any report?

Colonel HAINS. We did not go there with any idea of studying the Panama route with reference to making a report on it. We went there more for the purpose of seeing what had been done there. There had been a good deal of talk about it, and we went there to get an idea of how the French were doing the work and what it was costing them.

Senator MITCHELL. That was while you were a member of the Nicaragua Commission?

Colonel HAINS. Yes.

Senator HANNA. Who of the present Commission were with you at that time?

Colonel HAINS. Admiral Walker and Professor Haupt.

Senator HANNA. Was Professor Haupt with you on the Isthmus during the time of the recent examination of the routes?

Colonel HAINS. No, sir; he did not go with us at all then.

Senator HANNA. While you were examining the Panama route as a member of the Nicaragua Commission, did your examination extend, as far as the physical conditions were concerned, fully over the whole route, or were you just taking the statements of engineers?

Colonel HAINS. We did not examine the Panama route with reference to forming an idea as to the feasibility of a canal on that route. We did not even go up to the site of the Alhajuela dam, for instance, which we did on this last trip, when we went around and looked at everything. We looked at the Culebra cut, and we went down the river and we saw where the French had done their work on both sides; but it was more with a view to seeing what had been done and what it was costing. And then we hardly spent time enough there to have gone into a careful examination as to the practicability of the route.

Senator HANNA. Therefore, at that time your examination was simply superficial—your examination of the Panama route?

Colonel HAINS. Yes, it was rather superficial.

Senator HANNA. Did you examine the location of the Bohio dam at that time?

Colonel HAINS. Yes.

The CHAIRMAN. You mean the first time?

Colonel HAINS. Yes; we went to it.

Senator HANNA. How far did you go up the Chagres River?

Colonel HAINS. Only along the line of the canal. We did not go on

the Chagres River, except at the two ends, on that trip; just a short distance at each end.

Senator HANNA. The closing paragraph of your report says:

There are certain physical advantages, such as a shorter canal line, a more complete knowledge of the country through which it passes, and lower cost of maintenance and operation, in favor of the Panama route; but the price fixed by the Panama Canal Company for a sale of its property and franchises is so unreasonable that its acceptance can not be recommended by this Commission.

Now, do I understand by that language that you meant to say that the Panama route was the more feasible and practicable of the two routes on which to construct the canal?

Colonel HAINS. Yes; if——

Senator HANNA. In short, had the value fixed upon the Panama Canal Company's property been \$40,000,000, instead of \$109,000,000, your report would at that time have been in favor of accepting the route?

Colonel HAINS. So far as I am concerned.

Senator HANNA. Of course, I am only asking that.

Colonel HAINS. Yes. I should like to say right there, Senator, that the Isthmian Canal Commission has made three reports. The first report was the preliminary report, made in November, 1899. At that time it did not seem possible that any transfer of ownership of the Panama Canal rights could be passed to the United States.

Now, the law under which we were acting provided that we were to report on the practicability and feasibility of building a canal, to be under the control, management, and ownership of the United States. If it had been a question of mere practicability and feasibility, uncoupled with anything else, I should have said that the Panama route was the most practicable and feasible; but coupled with this other condition, and seeing no prospect of getting a transfer, my idea was that the only practicable route was the Nicaragua route.

When we came to make the other report later, the price charged for the Panama Canal was about \$109,000,000, as stated there, and we regarded that as an exorbitant sum, and on that ground threw it out of consideration again.

Senator HANNA. Now, you say that had the price at that time been \$40,000,000, you would have recommended the adoption of the Panama route, as far as you were concerned. In your own way state your reasons for selecting that route in preference to the Nicaragua.

Colonel HAINS. Well, there are a good many points to be covered in that. I have made a memorandum of some of them.

Senator HANNA. That is the information that the committee are after, General.

Colonel HAINS. And if you will allow me to use this memorandum to aid me in taking up the subject as I go along——

Senator HANNA. Certainly; you can read it, if you choose.

Colonel HAINS. No; it is not in shape for that.

There are certain physical advantages in favor of each route. One has some things in its favor and the other has other things. To me it was a question of weighing these various advantages and disadvantages and deciding which should carry the most weight.

Now, the first thing was the question of harbors. As you know, we have no harbor at Greytown, and there is no harbor at Brito, but there is a fairly good harbor at Colon and a good harbor at Panama, the two

termini of the Panama route. So that in the early stages of the work Panama has an advantage on account of harbors.

So far as the practicability of constructing harbors in Greytown and Brito is concerned there is no question about it. That can be done; but the cost of maintaining harbors on the Nicaragua route is going to be considerably more than that on the other route.

After the canal is finished, I do not think there would be much to choose, so far as harbors are concerned, but in the early stages of the work the advantages are with Panama.

Senator HANNA. You mean that there would be so much to choose, except as to the expense of maintenance?

Colonel HAINS. Yes; except as to the expense of maintenance. Of course, there will always be that in favor of the Panama route. We estimate that the maintenance of the harbor at Greytown will be about \$100,000 per annum and at Brito about \$50,000 per annum, and that there will be no expense for maintenance in Panama, but there will be an expense of about \$30,000 per annum at Colon. So that on the matter of harbors and the maintenance of harbors the advantages are in favor of Panama.

Another item is that of the railroad. It will be necessary to build a railroad, if one is not already built, in order to construct the canal.

In this respect Panama has a great advantage. There is a railroad there already built from one end to the other, and that railroad will be of great advantage in prosecuting the work, both in the early stages and throughout the whole time of construction.

In Nicaragua there is not anything on the line upon which a railroad should be located in order to be of benefit in the construction of the canal. So that in that respect Panama has advantages over the other route.

Then there is the question of dams. You can not build a canal such as is proposed without the construction of a dam to hold back the waters of Lake Nicaragua, and in pretty much the same way you can not build the canal at Panama without a dam somewhere across the Chagres.

The only suitable place for a dam across the Chagres, so far as the investigations have thus far been able to determine it, is near Bohio.

The site for the dam across the San Juan River that the last Commission determined on was at Conchuda. That is some 4 or 5 miles above the mouth of the San Carlos River.

Senator MITCHELL. How far is the mouth of this river from Greytown?

Colonel HAINS. By the windings of the river it is in round figures about 55 miles. It is about half way. I do not know just the exact number of miles, but it is fifty-odd miles. The distance is stated in the report here.

So far as foundations are concerned, the advantages would appear to be in favor of Nicaragua, if you were going to construct a masonry dam. But in Nicaragua it is necessary to pass the floods of the San Juan River over the dam, which makes a masonry dam practically imperative.

In Panama it is not necessary to pass the flood waters of the Chagres over the dam, so that a different kind of dam can be built at Bohio from what would be suitable in the other case.

The Commission studied that question pretty carefully, and finally

concluded that an earthen dam with a masonry core was the most suitable for Bohio, the surplus waters of the Chagres River being passed around through what is called the Gigante Spillway far from the dam. In the other case, there is sometimes going to be a considerable discharge over the dam, and at times the depth of water over the crest of the dam would be as much as 7 feet.

Senator HANNA. You are speaking now of Bohio?

Colonel HAINS. No; Conchuda. A 7-foot depth of water over a dam creates stresses on a dam that necessitate a strong structure. So that, while the foundations at Conchuda are better, I do not think there is very much difference in relative advantages at either place in regard to the construction of a dam. I think an earthen dam will satisfy the conditions at Bohio quite as well under the circumstances as the masonry dam at the other place will.

The CHAIRMAN. Would not an earthen dam at Conchuda be quite as appropriate as at Bohio?

Colonel HAINS. No; you could not do that, Senator.

Senator HANNA. Not with that 7 feet of water going over the crest of the dam?

Colonel HAINS. We have not got room to discharge all the freshet waters of the San Juan through another spillway. You have got to pass a part of that water over the dam. Still that is not an impracticable thing, but it is one of those matters that require exceeding care in the construction, and therefore a masonry dam would be absolutely necessary. I do not think it would be practicable to pass that water over any other kind of a dam than a masonry dam.

Senator HANNA. It would wear away the dam in time if it was an earthen dam.

Colonel HAINS. Yes.

Now, with regard to the length of the canal—

Senator HANNA. Before you leave that subject, I should like to have you express yourself with reference to the feasibility of the construction of this masonry core at the Bohio dam. The question has been raised about the difficulty of sinking the caissons to a depth of 128 or 130 feet and connecting them at the bottom—that it would be a feat of engineering that heretofore never has been accomplished. What is your judgment about that?

Colonel HAINS. I think there is a good deal in that. It is a difficult construction, there is no question about it; but I do not think it is impracticable. I think it is probable that a better kind of dam can be built there, of great width. Mr. Morison has designed a dam which he describes in a paper to be read shortly before the American Society of Civil Engineers, which may answer the purpose.

Senator HANNA. What is your judgment about it?

Colonel HAINS. I think it would. The material that underlies the present surface is variable at Bohio. There are numerous places where the boring tools have passed through sand; but I am inclined to think that a system of what they call stock ramming would stop the flow of water through that sand. Stock ramming is a process that was adopted on embankments at the Sault Ste. Marie Canal. It consists in forcing clay under pressure into the permeable material. Mr. Morison shows in his paper that the amount of seepage to be expected through the permeable material under the Bohio dam to be comparatively small; so small that it might be considered insignificant, and ultimately it

will stop. Now, it may be that these sandy places that we have found at Bohio are merely pockets that do not communicate with the river below.

The CHAIRMAN. On Morison's plan what would be the head of water at the dam?

Colonel HAINS. It is just the same as ours. It is about 90 feet maximum.

Senator HANNA. A seepage from that head of water underneath the dam is provided for, is it?

Colonel HAINS. Yes; he has a very long dam, so that it is quite probable that the seepage may not amount to anything; and, at any rate, according to the formulas that are now used for estimating seepage through material of that kind, he estimates that there is only about—I do not remember just what it is, but it is an insignificant amount.

The CHAIRMAN. Is it not quite probable that a 90-foot head of water there would be sufficient in its weight and power to convert that seepage into a tunnel?

Colonel HAINS. I think not.

The CHAIRMAN. Why? What would be the resistance that would prevent it?

Colonel HAINS. The weight of the superincumbent mass above it. Filters, you know, are constructed somewhat on that plan—filtering plants for water for cities.

Senator KITTREDGE. Do I understand, General, that you think the seepage would at some time stop?

Colonel HAINS. It is believed that it would stop, on account of the light material which passes through the sand. You see it necessarily passes through the sand with a very low velocity, and there is always a certain amount of matter that is in water on such streams as the Chagres, and that will be washed into these spaces and gradually fill them up.

Senator HANNA. Right there, General, I want to ask you—you have been to the upper part of the Chagres?

Colonel HAINS. Yes.

Senator HANNA. Were all the Commission there who were to go up to examine the upper part?

Colonel HAINS. I think we all were there, excepting Professor Haupt.

Senator HANNA. He was not there at all?

Colonel HAINS. No, sir; I think perhaps Mr. Johnson was not there, too, because I think he was taken sick just after we got up to Obispo.

Senator HANNA. Testimony has been offered here to the effect that the silt carried in solution in the waters of the Chagres River would in about twenty years' time virtually fill up the Bohio dam. What is your judgment about that?

Colonel HAINS. Well, I do not think it would.

Senator HANNA. In the examination of the Chagres River, what did you find the formation of the banks of the river to be, as to furnishing decomposed matter and silt for solution?

Colonel HAINS. Well, a great deal of it—I will not say the most of it, because we only went up about 10 miles above the location of the Albajuela dam—but a great deal of it is rock, and it is not material that would furnish much of that sort of matter.

Senator HANNA. Lower down would the banks be what you would call wash banks?

Colonel HAINS. Some of them in places would, yes; but as a rule the banks are not easily acted on. Of course there are plenty of places where there is sand, but sand is not held in suspension. It is rolled along the bottom.

Senator HANNA. After the construction of the dam how far would slack water extend up the valley of the Chagres?

Colonel HAINS. I can not answer that question exactly.

Senator HANNA. Ten or twelve miles?

Colonel HAINS. I think pretty nearly up to the dam. I do not remember exactly.

Senator HANNA. So that if there is any silt in solution in that water it would deposit before it got into the lake?

Colonel HAINS. Yes; the sand would be deposited in a portion of the Chagres River which is not utilized at all for navigation purposes on the canal route.

Senator HANNA. Then, summing up your ideas about the construction of the Bohio dam, you see no engineering nor physical difficulty in the way of constructing a suitable dam which would serve the purposes for which it is intended?

Colonel HAINS. At Bohio?

Senator HANNA. At Bohio.

Colonel HAINS. I think not.

Senator HANNA. Of course, if it came to the construction of the canal on that route, the kind of a dam to be constructed and how it should be constructed would be decided by the engineers after careful examination before they commenced their work, so that the results of the surveys are simply estimates of what might be the best, but subject to any changes as the result of experimental tests that might be made before they commenced their work.

Colonel HAINS. Yes. With my present knowledge of the conditions at the two places I would rather undertake the construction of a successful dam at Bohio in connection with the wasteways than I would at the other place, though the rock is higher at Conchuda than it is at Bohio.

Senator HANNA. Let me ask you right there, what has been your experience as an engineer with reference to public work? What line of work have you done?

Colonel HAINS. Well, I have been engaged on public works of various kinds ever since 1863; that is, about thirty-eight years. I have had constructions of all kinds, pretty much—fortifications, light-houses, harbor and river works, jetties, and all kinds of dredging.

Senator HANNA. You have had a varied experience?

Colonel HAINS. Yes.

Senator HANNA. Now, with reference to the further construction of the Panama Canal, this great conduit that has been under discussion, what have you to say about that?

Colonel HAINS. Now, Senator, if you will excuse me, I will go on with my memoranda. Then we will not omit anything.

Senator HANNA. That is all right.

Colonel HAINS. In regard to the length of the canal, the Panama Canal has 36.41 miles of canal section. It has 12.68 miles of lake navigation, a part of which is deepened. That is Lake Bohio.

The CHAIRMAN. You mean deepened by digging or dredging?

Colonel HAINS. Yes, sir. The upper part of it will be by dredging. It has no river navigation proper. Nicaragua has 73.78 miles of canal

section. It has 39.37 miles of river navigation, and it has 70.51 miles of lake navigation.

The total for Panama is 49.9 miles and for Nicaragua 183.56 miles.

The 39.37 miles of river navigation on the Nicaragua route I regard as the worst part of the whole business. We have always heretofore thought that the river was a great thing to aid us in the building of a canal; but really that river forms a troublesome part of the route. There are several places where it is necessary to cross the river in order to keep from having too sharp a curvature, and one of those places is near the mouth of the Savalos River. At times the discharge of the river at this point will be considerable, and it will give rise to a current amounting to about 4 feet per second—a little over 4 feet per second. To cross the river from where the canal comes out of the land on one side to where it enters the mainland on the other, with a current running 4 miles an hour across it, is going to necessitate pretty careful handling of big ships.

Senator HANNA. Particularly if they are near the bottom—particularly if there is not much water beneath the bottom of the ship.

Colonel HAINS. They will have plenty of water at the time when this current is the strongest.

Senator HANNA. At high water?

Colonel HAINS. At the time when this current is strongest they will have the most water; but still navigators regard the crossing of such a place, where the current strikes the vessel diagonally, as rather bad.

Senator HANNA. Strikes it on the quarter?

Colonel HAINS. Yes. Of course it is not impracticable, but it is an objectionable feature, and we would have gotten around it if there was any practicable way at reasonable cost. But we could not do it. So that when you come to the question of the length of the canal and the kind of navigation in it, I think that the advantages are in favor of Panama. There is no question about the length of the canal proper. The navigation through the canal would be in favor of Panama.

Then, there are currents in some of the canal sections. In a part of the canal from the dam near Conchuda to Greytown there are places where considerable water has to be taken into the canal from the drainage of the country, and there will be some current in those parts; but I do not think that would be sufficient to cause great inconvenience; in respect to that matter I think both routes are about equal, except there is a greater amount of it in the Nicaragua.

Senator HANNA. Coming as a wash from the surrounding country, would these currents carry with them any silt in solution?

Colonel HAINS. No, sir; I do not think there would be much of that. The water that would come in there comes from a country that is so densely covered with vegetation that it does not carry much sediment.

Now, in respect to the curvature. Navigators regard sharp curves as of considerable importance, and in all cases where we have curves we have increased the width of the canal to compensate as nearly as we can. There is no real, definite compensation for that sort of thing, but the practice has been to widen a certain amount for each radius, and we have carried out the practice. That is, about the same as is used on the Manchester Canal and the Suez; so that in respect to curvature the advantages are with Panama, because that has fewer curves.

Senator HANNA. What are the proportions as to the number.

Colonel HAINS. I do not remember exactly. It is given in the report.

Senator HANNA. That has been testified to.

Colonel HAINS. But the curvature is less, in amount; and, as a rule, with the exception of one place at the entrance of the canal at Colon, it is less in degree.

Senator HANNA. That curvature in the harbor of Colon is in a place where the channel can be widened?

Colonel HAINS. The channel is 500 feet wide.

Senator HANNA. And in some places 800 feet.

Colonel HAINS. In this place where the curvature is greatest, the width of the cut is 500 feet on the bottom.

Now, in respect to deep cuts, the deep cut at Panama is the Culebra cut. We have a deep cut also at Tambercito.

Senator HANNA. You are speaking now of Nicaragua.

Colonel HAINS. Yes, sir; I mean Nicaragua. The only deep cut at Panama is that at Culebra. On the other route we have three deep cuts on the east side of the lake, one at Tambercito, and two others between the lake and the river before you emerge into the river. The cut at Tambercito is in hard rock, and, while it is deep, there is no trouble about that. The conditions are favorable; but at these other two places the conditions are not favorable, and we find that underneath the rock there is a layer of clay. In one place we go through rock twice in our borings and then strike clay in the prism of the canal. That is not an ideal condition of affairs.

To get over that we made our slopes 1 upon 1 through the rock, and all through that cut; in other words, we did not treat that the same as we do the ordinary rock cut. We have flattened the slope to 1 upon 1 instead of 4 upon 1, which is the slope for rock.

The Culebra cut is a long one, but the material there is thoroughly understood now. It is well known, and is estimated upon slopes of one upon one, and I do not think there is any trouble about making that cut.

Senator HANNA. It is simply a question of quantity.

Colonel HAINS. It is a question of quantity alone; and really on the question of cuts, so far as we know them now, I think the advantages are a little in favor of Panama.

Then there is the question of time of passage through the canal independent of the time of passage between the ports; but the time of passage is decidedly in favor of Panama. It is a question of twelve hours through the Panama and thirty-three through the Nicaragua, which enables a vessel to pass through the Panama Canal by daylight, whereas on the other route it could not.

Senator HANNA. It could be arranged so that they could pass at night, could it not?

Colonel HAINS. By having plenty of lights. It is not expected that there would be any delay on account of night.

Senator HANNA. In figuring the thirty-three hours, do you figure a night passage?

Colonel HAINS. Yes.

The CHAIRMAN. What time did you give for the Nicaragua route?

Colonel HAINS. I think it is thirty-three hours.

The CHAIRMAN. How much for the other?

Colonel HAINS. Twelve for the Panama; but that is merely for the passage from sea to sea.

Now, in regard to the time of building, it will be noticed in respect

to the time of building the Nicaragua route the statement is made that if certain things happen we can build the work in eight years. My opinion is that there is really not much difference between the amount of time that it will take to build by either route. I do not think there would be much advantage either way.

Senator HANNA. The advantage of preparation would be in favor of Panama?

Colonel HAINS. Very much in favor of Panama.

Senator HANNA. How long would it take to accomplish the same results as to preparation on the Nicaragua route?

Colonel HAINS. Well, we estimate two years; but that includes the formation of a harbor at Greytown.

Both countries are liable to earthquakes; but I think in that respect they are about equal.

In regard to sanitary conditions, I think the advantages are decidedly with Nicaragua. The men that we had employed in Nicaragua, some of whom were there for a couple of years, were sick very little. There was very little sickness among them. I do not think the health of the men in Nicaragua was as poor as you would find it in many places in the United States.

Senator HANNA. How would it be when you commenced your digging and stirring up the primitive soil and the decayed vegetation?

Colonel HAINS. Well, there is generally an impression that it will create different conditions. I am inclined to think that the conditions, even then, will be in favor of Nicaragua; because on the east side, where the most troublesome work and the great mass of the work is, the rains are so heavy. While these rains are detrimental to construction I think they are beneficial so far as hygienic considerations are concerned, and I think so far as the considerations of sanitary conditions are concerned the advantages are with Nicaragua.

Now, in regard to the water supply for the canal, there has been a good deal said about a deficiency of water supply at Panama. I do not think there is any trouble about water supply. The water supply is ample for each place.

Then, in regard to the control of lake levels, each one of them will have a lake the level of which has got to be controlled. The control of the level of the lake in Nicaragua is going to be very much more difficult than the control of the level of Lake Bohio.

Senator HANNA. Why?

Colonel HAINS. Well, we know less about the rainfall, in the first place, and, in the second place, we have got to take all the water that is run out of Lake Nicaragua down through about 55 miles of river. It is not as though you could draw it off at the edge of the lake itself. We have got to take it through this long stretch of river, and that river is used for navigation purposes; so that I think, so far as the control of lake levels, which includes also the control of flood discharges, is concerned, the advantages are with Panama.

Now, in regard to the amount of information that exists with reference to the two routes, there is no question but what the advantages are with Panama. The country along the line of the Panama Canal is cleared; there is considerable of a population, a number of little towns. Much of it is cultivated; whereas, along the line of the Nicaragua route, on the east side, it is almost an absolute wilderness. There are hardly any habitations at all.

Senator HANNA. It is generally swampy.

Colonel HAINS. Well, a good deal of it is swampy; but I do not think the trouble is from that. A country that is settled is always a better country to do work in than a country that is absolutely unsettled. It is not only unsettled, but it is a tropical region. The clearing of the ground along the line of the canal is somewhat of an item in the expense. The trees grow very large and are difficult to cut, and still more difficult to get rid of after they are cut. You can not burn them.

Senator HANNA. Can not burn them?

Colonel HAINS. You can not get time enough to dry them in Nicaragua, on the eastern side.

Senator MITCHELL. What kind of trees are they?

Colonel HAINS. All kinds of hard-wood trees, and some of them very large. It would be almost impossible to burn them. The only way that steamboats down there get fuel is by cutting the wood, putting it under a shed and drying it in that way; but you could not undertake to put big trees under a shed to dry them so as to burn them.

In Panama they have an immense number of buildings for workmen and for storage of material along the route. That is a great advantage, and that is entirely with Panama, because there is nothing of the kind on the Nicaragua route.

In regard to rainfall, that in Nicaragua is, roughly speaking, about double that on the Panama route. At Nicaragua the rainfall is very heavy, running up to about 260 to 300 inches, but as you go farther inland it decreases. I think the maximum rainfall in Panama will only be about half that at Greytown. This heavy rainfall will necessarily retard the work, and increase the cost of it on the eastern side, but only on the eastern side.

In regard to the summit level, in the case of Nicaragua we have a summit level with a minimum of 104 feet above the level of the sea and a maximum of about 112. In Panama the summit level is 82 feet for the minimum and 90 for the maximum. That gives a pretty considerable advantage in favor of Panama in respect to the height to which vessels have to be lifted up to pass over the divide.

In regard to the lift of the locks the advantages are with Nicaragua. The maximum lift of the locks there is 36 feet. The maximum lift of the locks at Panama is 45 feet. There is this to be said, however, that in both cases the foundations are upon rock, but a lock of very high lift is not as safe as one of low lift. The advantages are in favor of Nicaragua.

Now, in respect to cost of operation and maintenance the advantages there are entirely with Panama. The cost of operating and maintaining the Nicaragua Canal is estimated at \$3,300,000, as against \$2,000,000 at Panama.

In respect to military advantages, I think the advantages are with Nicaragua. It is a shorter line between the two coasts of the United States.

In respect to industrial and commercial value, Nicaragua has the advantage. There is a chance there for the development of a good deal of a country, whereas the country along the line of the Panama route is much less in extent, and I do not think the climatic conditions are as favorable.

Senator HANNA. That would inure to the benefit of the country, not to the benefit of the canal.

Colonel HAINS. Yes, sir.

The CHAIRMAN. It is none the less beneficial on that account, is it?

Colonel HAINS. Well, I have taken that as one of the advantages that Nicaragua has over Panama.

You will notice that as to a good many of these items there is not much in them one way or the other, but I have tried to state them and assign the advantages to the side where they apparently go.

Then, lastly, in regard to the cost of construction, the cost of construction at Panama is less than that at Nicaragua, assuming that the concessions and that sort of thing can be obtained for a sum about equal.

Senator HANNA. In that connection, General, in making your estimate as to the relative cost, is it true that on the Panama route, from the fact that so much work has been done over the entire length of the canal, there is less left to conjecture—that is, you can figure more certainly as to cost than you can upon the proposition of the Nicaragua Canal, where it is simply a survey?

Colonel HAINS. There is no question about that.

Senator HANNA. That is a very important feature. Now, I want to go back to the operation of the canal as affecting the passage of vessels. You spoke of the difficulties in the passage of vessels by reason of the long canal feature and the rivers. With reference to the safety of that passage and as a guaranty, as a factor of safety, as to the cost of insurance. what would be the difference?

Colonel HAINS. Well, I really do not know. I have heard it stated that the insurance would be greater where the canal line is longer, and I suppose perhaps that is so; but I really do not know what there would be on that.

Senator HANNA. There would be additional risks, for whatever risk might occur in the passage of canals, in proportion to the distance, would there not, if there was any risk at all?

Colonel HAINS. Yes; there is no doubt about that.

Senator HANNA. And in the Nicaragua route, from the long canal and the river, in the narrow passage, as affected by the winds, would there be some difference in that regard?

Colonel HAINS. Yes; there would be some difference; but I really think that so far as that is concerned there is not much danger of a vessel becoming injured—that is, seriously injured—in a canal. She might be delayed. I can not see how it would affect the insurance very much.

Senator HANNA. The delay is quite a factor.

Col. HAINS. Well, that would be something, but not very much; I mean as affecting insurance. Delay to the vessel is a more serious thing.

Senator HANNA. In the various surveys of the Nicaragua route—and I understand there were several—who was the engineer for the Maritime Canal Company?

Col. HAINS. Mr. Menocal.

Senator HANNA. The route surveyed by Mr. Menocal was the route adopted by the Maritime Canal Company, was it?

Col. HAINS. Yes.

Senator HANNA. He was the engineer for the Maritime Canal.

Col. HAINS. Yes.

Senator HANNA. What have you to say with reference to the canal route that he surveyed?

Colonel HAINS. Well, I consider that route as decidedly inferior to the one that the Nicaragua Canal Commission adopted, which is practically the one that this Commission has adopted; and it is inferior from the fact that this one avoids a great many engineering problems that came up in the other.

Senator HANNA. I do not care to go into particulars with reference to that particular route, as that is obsolete; but I understand that it was abandoned by both the subsequent surveys made by the Nicaragua Commission.

Colonel HAINS. Yes; it was abandoned by the Nicaragua Commission, and was not considered as advisable by the existing Commission.

The CHAIRMAN. General Hains, I wish to read to you a table which I have prepared here. I will put it in as a table and I will read you the figures.

(Table not furnished.)

The CHAIRMAN. Commencing with the Childs survey in 1852 the terminals were Greytown and Brito.

Colonel HAINS. Yes.

The CHAIRMAN. The length of the route in miles was 194.4; the prism of the canal in the earth having a bottom width of 50 feet, and in the rock 50 feet, and a depth of 17 feet. The locks were 50 by 250 feet. The time of passage was 46.27 hours, and the estimated cost was \$31,558,319.

The unit prices in rock were \$1; in earth, 35 cents. The dredging prices were 60 to 80 cents per cubic yard; the embankments were 30 cents per cubic yard, and the unit price for rock under water was \$2.50 to \$5 per cubic yard.

Colonel HAINS. Yes.

Senator HARRIS. The total cost on this estimate was \$31,558,319. Did that route go practically on the same line on which the Isthmian Canal route has been established, at the low waters?

Colonel HAINS. Well, not altogether. A part of it did. He kept closer to the river than we do, and on the lower end his route followed, for a distance of some 8 or 10 miles, considerably to the south, about 10 or 12 miles to the southward of our line.

The CHAIRMAN. Nearer to the river?

Colonel HAINS. Nearer the San Juan River.

The CHAIRMAN. The prong of the San Juan River that runs in just below Greytown?

Colonel HAINS. Yes.

The CHAIRMAN. Just to the eastward of Greytown?

Colonel HAINS. Yes.

The CHAIRMAN. The river has two mouths, one called the San Juan and the other the Colorado.

Colonel HAINS. Yes.

The CHAIRMAN. The Colorado River is about 18 miles to the eastward of the San Juan, where it runs into the sea.

Colonel HAINS. Yes.

The CHAIRMAN. Has Mr. Childs always been regarded by engineers as a good authority?

Colonel HAINS. Yes.

The CHAIRMAN. Have the accuracy and faithfulness of his surveys ever been questioned?

Colonel HAINS. Wherever we have had occasion to go over the same ground that he went over we have found that his work was generally reliable.

The CHAIRMAN. Where he established bench marks, your surveys corresponded?

Colonel HAINS. I do not know whether we found any of his bench marks. I doubt whether any of his bench marks were found at all. It is so long ago that I guess they have all disappeared.

The CHAIRMAN. Is that a practicable canal, that depth and that prism, running in the manner in which he surveyed it, for ships that would draw less than 17 feet of water?

Colonel HAINS. I do not think there is any thing impracticable about it.

The CHAIRMAN. Mr. Childs's plan, if I remember it correctly, was for a dam at every one of the rapids of the San Juan River.

Colonel HAINS. Yes.

The CHAIRMAN. He took them one after the other, and built low dams.

Colonel HAINS. Yes; put low dams in.

The CHAIRMAN. About what was the height of the dams?

Colonel HAINS. I don't remember exactly. I think they did not run more than about from 18 to 28 feet, somewhere along there.

The CHAIRMAN. I notice his unit price for the excavation of rock is \$1, and that the unit price of the Isthmian Canal Commission for the same kind of work is from 80 cents to \$1.15. What has caused the rise in the unit prices from 1852 to 1902, in these fifty years, do you know?

Colonel HAINS. No, sir. Those prices, you know, Senator, are fixed from the best judgment that an engineer can apply to the case before him.

Senator HANNA. Yes.

Colonel HAINS. And I suppose that was his judgment at that time, and the other is our judgment at the present time.

The CHAIRMAN. Now, at the same time the machinery and appliances for excavating in rock, such as blasting powder, dynamite, and the like of that, have been greatly improved.

Colonel HAINS. Yes.

The CHAIRMAN. So that that kind of work ought to be cheaper now than it was in 1852 when he made his survey.

Colonel HAINS. Yes.

The CHAIRMAN. Has there not been a corresponding rise in the unit prices of every class of work, to and including the last survey? Have you not put the prices higher in the last survey than they ever were before?

Colonel HAINS. I can not say that they are higher, Senator, but the prices that an engineer fixes for making an estimate have got to be a matter of judgment, you know.

The CHAIRMAN. Of course, and you applied the same rule to both canals, the same unit prices.

Colonel HAINS. Well, differences may exist on account of different qualities of the rock. In one case a man's judgment may be that the

rock is such that you can get it out without blasting, and then he would be apt to put it at a low figure.

The CHAIRMAN. But you apply the same rule of unit prices for work of all kinds, to both canals alike?

Senator KITTREDGE. Under the same conditions.

The CHAIRMAN. You take the same unit of price for rockwork, for earthwork, for embankment, and for dredging in the one case that you do in the other, do you not?

Colonel HAINS. Well, I have never made an estimate, you know, for the Childs route. I have never tested the accuracy of his estimates or his unit of prices.

The CHAIRMAN. I am not speaking of that. I am speaking about what your Commission has done. Did you take the same units of value or of prices upon both canals to be exactly the same for the same classification of work?

Senator HANNA. When you say "both canals" you mean Panama and Nicaragua?

The CHAIRMAN. I mean Panama and Nicaragua. You mean that you have taken the same prices?

Colonel HAINS. Yes.

The CHAIRMAN. Now, a great deal in the cost of a canal depends upon the engineer's estimate of the unit of prices, does it not?

Colonel HAINS. Yes.

The CHAIRMAN. I mean the estimated cost, of course.

Colonel HAINS. Oh, yes; there is no question about that.

The CHAIRMAN. So that that is a factor of vital importance in the determination of the question of building a canal before you commence the work—the unit of prices.

Colonel HAINS. Yes.

The CHAIRMAN. Very good. Now I notice here Lull's survey in 1872 and 1873. Did that survey run practically over the same ground as the Childs survey?

Colonel HAINS. Pretty much the same route; yes, sir.

The CHAIRMAN. Did it contain the same number of dams and the same elevation of dams?

Colonel HAINS. I do not remember whether it had exactly the same number of dams, but it was pretty much the same. He passed over pretty much the same route.

The CHAIRMAN. And adopted the same plan of a canal?

Colonel HAINS. I think in a general way that it was the same plan of a canal.

The CHAIRMAN. That meant slack-water navigation in the San Juan River?

Colonel HAINS. Yes.

The CHAIRMAN. That is what it meant. It did not mean the backing up of the water of one dam to the level of the lake, and across the lake to the same level on the other side. It did not mean that?

Colonel HAINS. I am not sure whether Lull suggested a single dam near the mouth of the San Carlos River, or whether he had several dams above that.

The CHAIRMAN. The length of the canal in the Lull survey is 181.26 miles, according to the report. The prism of the canal in the earth, bottom width, was from 50 to 72 feet, according to conditions and circumstances.

Colonel HAINS. Yes.

The CHAIRMAN. In the rock it was 60 feet, and the depth of the canal was 26 feet. The locks were 70 by 400 feet, and there were 21 of them. I forgot to mention that in the Childs survey there were 28 locks.

Colonel HAINS. Different lifts.

The CHAIRMAN. Yes. Now, Lull's estimate was \$65,722,147, and his unit of prices for work in rock was \$1.25 to \$1.50; for earth work 35 cents, and for dredging 30 to 40 cents per cubic yard; for embankments 10 cents, and for concrete \$8 per cubic yard; for rock under water \$5 per cubic yard. Would that be a practicable canal at that depth, and with that prism, in those waters, across from ocean to ocean?

Colonel HAINS. Yes; if I have this project in my mind correctly.

Senator HANNA. Under whose auspices was that survey made? Was it under the Government?

Colonel HAINS. That was made under the Government; yes.

The CHAIRMAN. Made by the Government, as I understand, and paid for by the Government also?

Colonel HAINS. Yes.

The CHAIRMAN. Now we come to Mr. Menocal's survey for the Maritime Canal Company, made from 1887 to 1892. He made the distance from Greytown to Brito 169.05 miles. He made the prism of the canal in the earth 120 feet, and in rock 100 feet, and the depth 30 feet. The locks were 80 by 650 feet, and there were 6 of them. The time of passage was 28 hours. The estimated cost was \$66,466,880. The unit of prices for rock was \$1 to \$1.25; for earth, 40 cents; for dredging, 15 to 25 cents; for embankments, 30 cents; for concrete, \$6, and for rock under water, \$3. You say you do not approve of his plan?

Colonel HAINS. He had two plans. Is that the last one?

The CHAIRMAN. No; this is the first one. That ran along the line of the Lull survey.

Colonel HAINS. Yes; that was what was called the low level.

The CHAIRMAN. The low level? He did not have the Ochoa dam in that, did he?

Colonel HAINS. Not on the low level; that ran practically on the same survey as Lull's. There was a high dam at Ochoa in the route advocated by Menocal. How many locks were there in that plan?

The CHAIRMAN. Six locks.

Colonel HAINS. You must have the last project.

The CHAIRMAN. Well, it may be. Yes, I think that is so, judging from the distance, because he cuts the distance down from 194 miles, as given by Childs, to 169 miles.

Colonel HAINS. Yes, by making that straight cut across the divide.

The CHAIRMAN. We are speaking now of Mr. Menocal's survey for the canal company.

Colonel HAINS. Yes.

The CHAIRMAN. That is different from the Lull survey?

Colonel HAINS. Yes.

The CHAIRMAN. That left the river at Ochoa, went across the divide, went back of the ridges, and fenced out the waters coming down from the hills.

Colonel HAINS. It took a nearly straight line from Ochoa to Greytown, by which he saved nearly 11 miles in distance.

The CHAIRMAN. That, you say, the subsequent engineering commissions down there have disapproved?

Colonel HAINS. Yes.

The CHAIRMAN. On the ground that there was too much embankment, and on the supposed difficulties of the Ochoa dam?

Colonel HAINS. Well, that was on account of the difficulties of building the Ochoa dam, and the difficulties of constructing not only the Ochoa dam but also the La Flor dam, on the west side, and the embankments. He had three very heavy embankments, one across the San Francisco River which discharges into the San Juan. He had to cross three streams over which he had very heavy embankments.

The CHAIRMAN. With viaducts underneath, I believe?

Colonel HAINS. No, sir; I do not think he had, with those. He had spillways over the Ochoa dam, and also another one down near the Deseado, where he had another dam.

The CHAIRMAN. But, at all events, the subsequent commission did not take Mr. Menocal's plan?

Colonel HAINS. No, sir.

The CHAIRMAN. The dam that he proposed to put in at Ochoa was a rock-filled dam, and he proposed to get the rock out of that rocky divide which is 4 miles across.

Colonel HAINS. Yes.

The CHAIRMAN. I want to ask you whether a rock-filled dam is as good as a clay dam?

Colonel HAINS. I should not regard either a rock-filled dam or a clay dam as practicable at Ochoa.

The CHAIRMAN. As to the value of dams as giving resistance to heavy water, is a rock-filled dam as good as a clay dam?

Colonel HAINS. There might be circumstances under which it would be, but a rock-filled dam that is just rock alone would not be tight.

The CHAIRMAN. But of course everybody would know that a dam, to be a dam at all, would have to be tight—tightened up with clay or something.

Colonel HAINS. Then you would practically get down to a clay dam, Senator, and your rock filling would be merely something to support your clay.

The CHAIRMAN. Now, that is the case also in the dam that Mr. Morison proposes to put at Bohio. He has got two rock-filled dams with-clay between them.

Colonel HAINS. Yes, but Senator, the rock fills that he puts there are merely to hold the clay in place. That is not properly the dam. The dam is the clay—the piles of rock he has got are merely to hold the clay in place.

The CHAIRMAN. He has got one above and one below?

Colonel HAINS. Yes.

The CHAIRMAN. That is his dam?

Colonel HAINS. Yes.

The CHAIRMAN. That rests on the bottom of the river or a few feet below. Now, I am not going to ask about the practicability of building a dam at Ochoa, because that is not in the case; but what I want to get at is this: Whether a great mass of water, 80 or 90 feet high, like the Chagres River would be in time of flood, when it is 30 or 40 feet above its normal level—whether that mass of water can be resisted

successfully and safely by a clay dam with rock-filled facings upstream and rock-filled facings below downstream.

Colonel HAINS. So far as the practicability is concerned, yes, sir. Earthen dams now are adopted by engineers for a very much heavier head of water than they used to be formerly. The best authorities now will go considerably above that height for an earth dam.

The CHAIRMAN. I understood you to express the opinion that——

Colonel HAINS. I say good authorities; I won't say the best authorities always.

The CHAIRMAN. I understood you to express the opinion in reference to Mr. Morison's dam that it was a better dam than the one proposed by the Isthmian Canal Commission.

Colonel HAINS. Yes; I think it would be a better dam.

The CHAIRMAN. And notwithstanding that underneath the dam there would be strata or belts of sand and gravel, water-permeable material, how far below the bottom of Mr. Morison's dam would that permeable material extend until it struck rock—how many feet in depth would that be below the bottom of that dam?

Colonel HAINS. I don't remember just exactly how deep it would be to rock.

The CHAIRMAN. It is 128 feet from the surface.

Colonel HAINS. Yes; I was going to say it is about 128 feet from the surface.

The CHAIRMAN. Very good. Now, his dam then is 60 feet from the surface, and then the balance would be this permeable material underlying. Now, is it your judgment, as an engineer, that that is a safe dam?

Colonel HAINS. As I said before, I do not think that the question of the best type of dam for that place has been definitely settled.

The CHAIRMAN. Has not been?

Colonel HAINS. I do not think so. I think the dam that is proposed by this Commission is perfectly practicable and safe, but I think that Mr. Morison's dam would perhaps be a better one under the circumstances. Now, it depends a good deal on what you found in that permeable material, and how coarse the sand is, and how much there is of it. If that is in pockets, there will be no trouble in stopping the water.

The CHAIRMAN. Well, now, the Commission of which you were a member, the Nicaraguan Canal Commission—you were a member of that?

Colonel HAINS. Yes.

The CHAIRMAN. They estimated the length of route at 187.31 miles. You said that you had spent some months in making that survey.

Colonel HAINS. Yes, sir.

The CHAIRMAN. How long?

Colonel HAINS. You mean this last one?

The CHAIRMAN. No, sir; I mean the one that you and Mr. Haupt and Admiral Walker were on.

Colonel HAINS. I spent about three months down there.

The CHAIRMAN. About how many engineers did you have under your employment?

Colonel HAINS. I should say from 30 to 50; I don't remember.

The CHAIRMAN. Skilled engineers?

Colonel HAINS. Yes, sir.

The CHAIRMAN. About how many employees were there of all kinds, including the engineers?

Colonel HAINS. I do not remember. I suppose a couple of hundred—two or three hundred.

The CHAIRMAN. Well, you made a very careful survey, did you not?

Colonel HAINS. Yes.

The CHAIRMAN. One that you are willing to stand on and make recommendations on for spending money by the Government?

Colonel HAINS. Yes.

The CHAIRMAN. And you made a survey on a line of 187.31 miles, and then you had a bottom in earth of 150 feet and you had a bottom in rock of 150 feet and you had a depth of 30 feet. Your locks were 80 feet by 620 feet. Those locks would accommodate 90 per cent of the ships in the world now?

Colonel HAINS. Yes.

The CHAIRMAN. Maybe more. Then you had ten locks, five on a side?

Colonel HAINS. Yes.

The CHAIRMAN. The time of passage you did not give, but you had an estimated cost of \$118,113,790?

Colonel HAINS. No; I did not.

The CHAIRMAN. I mean the Commission did—the majority?

Colonel HAINS. The majority of the Commission did; yes, sir.

The CHAIRMAN. And you dissented?

Colonel HAINS. Yes, sir.

The CHAIRMAN. And you put your price at what?

Colonel HAINS. About \$135,000,000.

The CHAIRMAN. So that the difference between you was between \$118,000,000 and \$135,000,000 for that construction?

Colonel HAINS. Yes.

The CHAIRMAN. Now, the unit prices that you adopted were as follows: In rock, \$1.03 to \$1.30 per cubic yard; in earth, 44 cents per cubic yard; in dredging, 20 to 30 cents per cubic yard, and the embankment you did not make any provision for. You did not make any estimate. For concrete, \$7.23, and for rock under water, \$5 a cubic yard. Now, was that a good canal? Where did you have your dam?

Colonel HAINS. Was it a good canal?

The CHAIRMAN. Yes; was that a safe, reliable canal?

Colonel HAINS. I think that it was a practicable canal.

The CHAIRMAN. And one that the Government could afford safely and reliably to build, and depend upon it to spend its money?

Colonel HAINS. Yes.

The CHAIRMAN. And one that would stay there after you put it there?

Colonel HAINS. Yes.

The CHAIRMAN. Where did you have your dam?

Colonel HAINS. At Boca San Carlos.

The CHAIRMAN. How high was it?

Colonel HAINS. I think it was about 110 to 120 feet in the deepest part; something like that.

The CHAIRMAN. It was a rock bottom, a good, sound, solid rock, of course?

Colonel HAINS. So far as our borings showed.

The CHAIRMAN. You bored enough to ascertain, I suppose?

Colonel HAINS. No, sir.

The CHAIRMAN. Why did you recommend it if you did not bore it sufficiently?

Colonel HAINS. We bored as many as we could. Our money ran out and we had to stop, and we had to make a report, and we made only six borings across that line.

The CHAIRMAN. How far apart were they?

Colonel HAINS. Well, the whole length of that dam was about from 1,500 to 2,000 feet, and we really had six borings.

The CHAIRMAN. Did you bore it out subsequently?

Colonel HAINS. Yes; under this new Commission.

The CHAIRMAN. How did you find it when you bored it out?

Colonel HAINS. We found the rock deeper than we supposed it was.

The CHAIRMAN. Was it a continuous rock across the stream?

Colonel HAINS. Yes.

The CHAIRMAN. A good solid rock?

Colonel HAINS. Yes.

The CHAIRMAN. Was it a harder rock than you found at Bohio?

Colonel HAINS. Well, when you get down to rock, we mean good hard rock.

The CHAIRMAN. Well, you spoke of the rock at Bohio not being as hard as that at Conchuda and I wanted to know if this rock was as hard as that at Bohio.

Colonel HAINS. I did intend to convey that idea; that the rock was harder, Senator.

The CHAIRMAN. I misunderstood you then. The last commission moved your dam from Boca San Carlos some miles up the river to Conchuda?

Colonel HAINS. Yes.

The CHAIRMAN. How far?

Colonel HAINS. About as near as I can recollect 4 or 5 miles above the Boca San Carlos.

The CHAIRMAN. Why did you move it?

Colonel HAINS. When this Commission went to work to explore the site of the San Carlos dam we needed more borings, and we laid out a plan to have borings a distance apart of only about 100 feet. We made borings at those intervals and we found the bottom developed two depressions in the rock, which we had not discovered before, and the distance, the extra distance was something like 30 feet more in these depressions; so that that was not regarded as a good place for a dam under these circumstances if we could find a better one. We agreed that it was practicable to build a dam there, but we saw another place up there at Conchuda where the conditions promised favorably, and we made three lines of borings across that, two of which we threw out as not as good as the other at Boca San Carlos, but the other one was a great deal better.

The CHAIRMAN. How far apart were the lines?

Colonel HAINS. Oh; I do not think there were more than about—well, I can not say exactly, but I should say about five or six hundred feet apart.

The CHAIRMAN. The three lines were about 500 or 600 feet distant from each other?

Colonel HAINS. Something like that.

The CHAIRMAN. Now, you found a less depth of water than you found at Boca San Carlos?

Colonel HAINS. It was a less distance from the surface of the water to the rock.

The CHAIRMAN. To the rock, not to the surface of the stream. I was in error about that. So you concluded that it was better to build a canal that additional distance in order to make that advantage at Conchuda?

Colonel HAINS. Yes.

The CHAIRMAN. Well, that would show, to my mind at least, that the depth of rock was a factor of immense importance that would justify the building of 4 or 5 miles of canal in order to get to it.

Colonel HAINS. You are right.

The CHAIRMAN. Is it your estimate that it is a matter of immense importance?

Colonel HAINS. It is a matter of very great importance where the water passes over the dam, and that was expected to be the case in both of these instances at San Carlos and at Conchuda. We would have to pass the water over the dam.

The CHAIRMAN. At Conchuda you still provided for gates to let the water off below the level of the dam, so as to pass the water through the gates?

Colonel HAINS. No, sir; those gates are on top of the dam, Senator.

The CHAIRMAN. Well, on top you provided gates for confining the water to the gates, instead of pouring over the entire dam.

Colonel HAINS. It would pass right over the dam; the gates are put on top of the dam.

The CHAIRMAN. What are they put there for?

Colonel HAINS. To hold the water.

The CHAIRMAN. To control it?

Colonel HAINS. And to prevent it from going over the dam.

The CHAIRMAN. If you don't want it to?

Colonel HAINS. Yes.

The CHAIRMAN. That is what I meant exactly. Then also you would have the advantage of the canal leaving that dam after it was made a mile or two miles above, to draw this entire quantity of water—you would have the advantage of the canal's presence to draw off the water from that dam.

Colonel HAINS. Senator, that would not amount to anything appreciable to help the discharge at the dam.

The CHAIRMAN. It would not?

Colonel HAINS. No, sir; you could not discharge it through the canal. You see the canal would have too small a section; we have to discharge there on the San Juan River frequently and for a long period of time, a month or so at a time, fully 70,000 cubic feet a second.

The CHAIRMAN. Now, that is done through gates?

Colonel HAINS. It is not done exactly through gates. It is done through spaces on top of the dam that are provided with gates for shutting off the flow when you wish to.

The CHAIRMAN. And you discharge through the gates when you want to—when it is necessary?

Colonel HAINS. Yes. You raise the gates and the water goes over the dam.

The CHAIRMAN. What is the prism of those gates as compared with the prism of the canal?

Colonel HAINS. You mean the sum total of the——

The CHAIRMAN. Take a gate at a time, one gate, how does that compare with the prism of the canal?

Colonel HAINS. Well, there is 7 feet of water on top of the dam as against 35 feet in the lock, or in the canal, and a width, I think, of 30 feet; I think we have got about 30 feet by 37.

The CHAIRMAN. What is the width of the canal?

Colonel HAINS. One hundred and fifty feet on the bottom.

The CHAIRMAN. So your gates are 30 feet, the canal 150 feet, and your gates discharge 12 feet of water above the dam as your canal discharges 35 feet.

Colonel HAINS. Oh, Senator, the water goes over that dam at a tremendous velocity.

Senator HANNA. How many of those gates do you have on top of the dam?

Colonel HAINS. I don't remember.

The CHAIRMAN. Your gates are not wider than the width of the river?

Colonel HAINS. No, sir; but they take up nearly the whole top of the dam—that is, about 1,200 feet in length.

The CHAIRMAN. That is what I supposed it. I was just getting at a general idea of how much pressure there was there. Now, at the Panama Canal what was your particular assignment of duty?

Senator HANNA. Before you leave that subject may I ask you, Mr. Chairman, if you have the figures in that table of the last estimate of the Isthmian Canal Commission?

The CHAIRMAN. Yes.

Senator HANNA. You have not read that.

The CHAIRMAN. And before proceeding with that question I will read the figures of the Isthmian Canal Commission. The length of the canal is 180.59 miles. The prism is 150 feet in rock at the bottom and 150 feet in earth, and the depth is 35 feet, and the locks are 84 by 740 feet, and there are eight of them. The time for passage is thirty-three hours. The estimated cost is \$189,140,062. The unit prices of excavation in rock are 80 cents to \$1.15 a cubic yard; in the earth, 45 cents; dredging, 20 cents; embankments, 60 cents; concrete, \$8 a square yard, and rock under water, \$4.75.

Senator HANNA. The additional cost of this estimate just read above the estimate of the Nicaraguan Commission is owing to the enlargement of the canal?

Colonel HAINS. Partly.

Senator HANNA. What is the balance of it?

Colonel HAINS. The judgment of the members.

The CHAIRMAN. A change of opinion.

Colonel HAINS. And it is a different commission.

The CHAIRMAN. I grant you that. I do not think there are any rock-bound opinions in the world.

Colonel HAINS. It is a different commission.

Senator HANNA. I wanted to know what the basis of the increase of cost was.

The subcommittee then (at 12.30 p. m.) took a recess until 2.30 o'clock in the afternoon.

AFTER RECESS.

The subcommittee met at 2.30 o'clock p. m.

Present: Senators Morgan (chairman), Hanna, Harris, Hawley, Kittredge, and Millard.

ADDITIONAL STATEMENT OF COL. PETER C. HAINS.

The CHAIRMAN. I believe I was about to ask you the question, when some matters intervened, as to the particular charge that you had at Panama of any work there. Did you have any?

Colonel HAINS. You mean on this last Commission?

The CHAIRMAN. Yes, the last Commission.

Colonel HAINS. I had no special charge of anything.

The CHAIRMAN. Well, Mr. Morison and General Ernst and who else was it that had charge?

Colonel HAINS. Professor Burr. That formed the committee on the Panama route.

The CHAIRMAN. For the study of the Panama route?

Colonel HAINS. Yes; but still the other members, of course, had to study it also.

The CHAIRMAN. Well, you came back here and left a boring party which had been working at Bohio dam, which followed you on, and arrived on the day of your examination before this committee, if you remember?

Colonel HAINS. Yes; we sent another boring party down there later.

The CHAIRMAN. Under whose charge was it—who was the man that had the boring party in charge?

Colonel HAINS. I don't think any special person on the Commission was in charge. There was a man named Smith, I think, in charge of that party.

The CHAIRMAN. Was he a civil engineer?

Colonel HAINS. He was a civil engineer, as I remember him, and had had a good deal of experience with boring for determining engineering questions.

The CHAIRMAN. Do you know where he is now?

Colonel HAINS. No, sir.

The CHAIRMAN. Well, there is a wide difference of statement here as to the distances at which these borings took place—the distance apart—on the line on which the dam is to be located under the report of the Isthmian Canal Commission.

Colonel HAINS. I would not undertake to state from memory. I think the drawings are the best thing to refer to. The drawings are correct.

The CHAIRMAN. Well, they vary from 50 feet to 200 feet.

Colonel HAINS. Apart, you mean?

The CHAIRMAN. In statements about it.

Colonel HAINS. Not differences in different maps?

The CHAIRMAN. No; I don't know anything about the maps. I mean the statements of the engineers who have been examined here before this committee vary at from 50 feet to 200 feet apart.

Colonel HAINS. I would rather not make a statement as to the distances apart. I would rather refer to the borings.

The CHAIRMAN. Have you any knowledge at all of that last line of

borings across the dam at Bohio, except the examination of the borings at one time?

Colonel HAINS. That and the drawings.

The CHAIRMAN. So that you draw your conclusion as to the solidity of the rock across the bottom of the Bohio line on which this dam is proposed to be located from those borings and from the location of them as put on the map by Mr. Smith?

Colonel HAINS. And the report made by him.

The CHAIRMAN. Did you ever make a personal examination of the locality on which the dam is now proposed to be established?

Colonel HAINS. We made——

The CHAIRMAN. I am speaking of you personally.

Colonel HAINS. Well, I was going to say, I personally visited the locality where this dam is to be built when we were on the Isthmus the last time. The special strip of ground on which this lies, I don't know whether I was on that or not, but we went all over that ground; we spent one entire day walking all around there.

The CHAIRMAN. Up and down the river?

Colonel HAINS. No; on each side of the river.

The CHAIRMAN. That is what I mean.

Colonel HAINS. We had cars at our disposal, so that we did not have to walk very much, but still there was considerable walking, too.

The CHAIRMAN. The present Commission established, or attempted to establish, lines of borings across there, did they not?

Colonel HAINS. Yes, sir.

The CHAIRMAN. About what distance were the lines apart?

Colonel HAINS. I would rather refer to the drawings than undertake to answer that.

The CHAIRMAN. Was it any considerable distance—as much as 50 feet or 50 yards?

Colonel HAINS. The different borings?

The CHAIRMAN. No; the lines of borings.

Colonel HAINS. Oh, well, there were lines in various places. I do not suppose the borings—well, in some places they were not closer than 100 feet, the borings themselves, and the lines of borings, I suppose, in some cases must have been several hundred feet.

The CHAIRMAN. Now, at one of these borings, or more, above the line that you finally adopted, did not the borings come down to as much as 150 or 160 feet before you struck rock?

Colonel HAINS. There were places there above the site that we chose where it was a pretty considerable depth to rock, but I don't remember exactly what it was.

The CHAIRMAN. Do you think it was as much as 150 feet?

Colonel HAINS. I think in some places it was fully that.

The CHAIRMAN. And below that, in some places, quite as deep.

Colonel HAINS. The rock bottom was irregular. I can not say how deep, however, those borings went.

The CHAIRMAN. Were there any places in the vicinity of this dam along that natural gulf or geological valley where you did not find any rock bottom at all?

Colonel HAINS. Oh, I think there were a number of places where they did not find any rock, but they stopped the borings before they had gotten down to it. It made it very expensive to bore any further.

The CHAIRMAN. What I want to get at is the fact that this geological

valley that is described by Mr. Morison there is an irregular valley as to depth and as to width.

Colonel HAINS. Yes.

The CHAIRMAN. It is both, is it?

Colonel HAINS. It is; that is unquestioned.

The CHAIRMAN. And that it is filled up from its rock bottom, wherever that is, to somewhere along the surface of the river with different layers which have been transported into it?

Colonel HAINS. Well, I suppose so. How this has been filled up, of course, is a matter of conjecture largely.

The CHAIRMAN. Isn't it your opinion, from all that you have seen there, that the Chagres River is the agent that has filled up that geological valley?

Colonel HAINS. I should judge that all the sand deposits were deposits from the river.

The CHAIRMAN. Now, how deep did the borings go into the rock at the bottom of the location where you propose to establish this dam?

Colonel HAINS. Our orders were to carry the borings when they struck rock—to carry them down at least 10 feet into it, in order that it might be determined absolutely that it was not a boulder.

The CHAIRMAN. Would that determine the fact that it was not a boulder?

Colonel HAINS. Not absolutely.

The CHAIRMAN. There might be boulders more than 10 feet thick?

Colonel HAINS. Yes.

The CHAIRMAN. Otherwise, you could not tell the difference between the bottom as to whether it was a boulder or a uniform stratification.

Colonel HAINS. No; but that would be the same in all kinds of borings, however. It would be the same thing at Conchuda as here. We have to base our judgment on this by certain indications, and of course they are not infallible unless you go to such a depth that it would be very expensive, when you consider the number of them that you want.

The CHAIRMAN. How far above the dam at Bohio, where you locate it, are those drifts or sand bars from where the railroad company hauls out material to ballast its tracks by running lines down upon the beds that have been washed there—how far above?

Colonel HAINS. I don't know.

The CHAIRMAN. You have seen them, haven't you?

Colonel HAINS. I don't know that I have.

The CHAIRMAN. Have you not seen those railroad lines run in on those beds to transport material out to ballast the road?

Colonel HAINS. I don't recollect that.

The CHAIRMAN. You are not aware of the fact, then, that there have been heavy drifts of material into the Chagres River around the bend there from Obispo down, and above Obispo, which constitute the washings from the banks and from the bottom of the upper Chagres and is composed of gravel and clay and other materials?

Colonel HAINS. If I understand your question correctly, I do not think anybody does.

The CHAIRMAN. Well, it has been sworn to here by the man who was the trackmaster of that railroad for six years, and who runs his tracks out there and hauled the material.

Colonel HAINS. Maybe I do not understand your question exactly.

The CHAIRMAN. Assuming that the beds are there.

Colonel HAINS. Beds of sand?

The CHAIRMAN. Gravel and clay and other material that was washed down there by the Chagres River, and that he ran his tracks out on them.

Colonel HAINS. How can anybody tell how it got there?

The CHAIRMAN. That is exactly what I want to get your opinion on—whether it was imported there otherwise than by the Chagres River.

Colonel HAINS. I can not answer that question, because I don't know just exactly where it is, and I don't know the character of material.

The CHAIRMAN. Drifts of that kind would indicate both a torrential stream, I suppose, and banks that are destructible by a flood of waters.

Colonel HAINS. Well, so far as the torrential character of the stream is concerned, we do not have to go to that to know that. We know that the Chagres River is a torrential stream.

The CHAIRMAN. I assume that, of course. Now, then, if it runs through banks which are destructible by attack of water, then if you found drifts below that, of the kind I speak of—sand bars we call them—bars of material running out into the stream strong enough to sustain a railroad track, and in sufficient quantity to ballast a whole railroad forty-odd miles long, then you would believe that that drift had come out of the Chagres River, out of the banks?

Colonel HAINS. I think I understand now what your question refers to. The sand and gravel that was taken by this man is from the bed of the Chagres River, is it not? Because there was a place——

The CHAIRMAN. He said from bars that had been formed.

Colonel HAINS. Bars that are formed out in the river?

The CHAIRMAN. Yes.

Colonel HAINS. Oh, yes; to that question I will say yes. I thought you were referring to the sand and gravel in the fixed land, what is now fixed land.

The CHAIRMAN. No; I am talking about bars that are formed in the river.

Colonel HAINS. I did not understand that. Yes; I know now what you mean. I remember now the places that you refer to, where material like sand and stuff had been taken from bars in the river.

The CHAIRMAN. That would indicate the torrent of the river had brought this stuff down and deposited it there necessarily?

Colonel HAINS. Yes.

The CHAIRMAN. Would that be within the circumference of Lake Bohio where you saw these things?

Colonel HAINS. As I remember it, I think that was some considerable distance above this place, Bohio, near where the dam is proposed.

The CHAIRMAN. Would it be above this still water that would be created by the Bohio dam, or within those waters?

Colonel HAINS. After the dam was constructed, yes; this stuff would be in quiet water, the stuff that is there now, which would not be washed.

The CHAIRMAN. Then, when a witness states his opinion, that the Chagres River would silt and throw a great deal of material into Lake Bohio, do you consider that an unreasonable opinion?

Colonel HAINS. Such an opinion, you mean, would be unreasonable?

The CHAIRMAN. Yes.

Colonel HAINS. Well, I would not give much for the testimony of any man who says that the Chagres River will necessarily bring down a large amount of detritus, such as sand and gravel, after the Bohio

Lake is formed, and deposit it in places where it would be injurious to navigation, in quantities sufficient to be injurious. I would not say there would be none, but if there is any quantity at all it would be removed, as a matter of course, by dredges that are maintained there.

The CHAIRMAN. What is the highest flood that you recognize as having existed in the Chagres River?

Colonel HAINS. About 40 feet.

The CHAIRMAN. Above the normal level?

Colonel HAINS. Yes.

The CHAIRMAN. Within what space of time would that flood gather?

Colonel HAINS. It comes up very suddenly.

The CHAIRMAN. Well, within twenty-four hours?

Colonel HAINS. I expect pretty nearly twenty-four hours.

The CHAIRMAN. How far do you think such a torrent as that would pass across the still waters of Lake Bohio as a current or a strong current?

Colonel HAINS. I do not catch the idea.

The CHAIRMAN. A torrent comes down 40 feet high, accumulated in twenty-four hours, out of the Chagres River, and strikes Lake Bohio with its placid waters, and I want to know how far you think that torrent would go before its velocity was checked.

Colonel HAINS. Well, when a torrent like that comes, it comes gradually, to a certain extent. It comes within 24 hours, but it does not come as a wave. It rises to that height. Now, I don't know that it has ever risen as much as 40 feet in 24 hours, but it has risen, I suppose, as much as 30 feet in that time. But by means of a dam up at Alhajuela, the discharge of the Chagres River can be reduced nearly one-half.

The CHAIRMAN. I will get to the dam presently. I know your opinions on that, as heretofore stated, and if they are changed I want to know the reasons for it. Now this torrent of water, whether it disperses itself gradually or not, would bear a great amount of silt, would it not?

Colonel HAINS. Where the river was confined and the velocities were great, of course, sand and gravel would be washed along the bottom.

The CHAIRMAN. Well, now, the river is confined above Obispo, is it not? It is between narrow banks, narrow hills.

Colonel HAINS. Well, in some places it is a little narrow; in others, the flat land makes out some distance.

The CHAIRMAN. As a rule, the general proposition is that it is confined between narrow hills from Alhajuela down to Obispo.

Colonel HAINS. Well, it is not confined very closely. It is a right good stream.

The CHAIRMAN. What is the declination from Alhajuela dam down to Obispo? What is the elevation of Alhajuela dam above Obispo?

Colonel HAINS. Well, I would not like to say; I would have to guess at that, because I do not know.

The CHAIRMAN. You would think it is as much as 50 feet?

Colonel HAINS. I should think as much as that?

The CHAIRMAN. Well, that for a linear distance of 10 miles is a pretty steep fall.

Colonel HAINS. Yes; but I do not think it is as deep as that—the surface of the water in its ordinary stages.

The CHAIRMAN. What I wanted to get at is this: If this torrential

flood of water is loaded up with silt anywhere along the Chagres River above Obispo, and it comes on down in this rapid torrential flow and breaks into Lake Bohio, would it not be apt to deposit its silt at any point in that lake where the force of the current was broken?

Colonel HAINS. It would be apt to; but I do not think the quantities would be so great that they could not be quickly removed.

The CHAIRMAN. In order to remove any of it you would have to dig out all the timber and stumps, and everything like that, out of Lake Bohio, in order to do it with a dredge?

Colonel HAINS. If there are stumps and things in there.

The CHAIRMAN. Are there not?

Colonel HAINS. I don't know whether there are or not. There are not many along the line of the proposed dredging, I think.

The CHAIRMAN. I am not speaking of the dredging; I am talking about the great circumference of that lake, which is large—larger than the French lake proposed. You have got it now so that it will cover somewhere between 35 and 45 square miles. In that area is there any timber growing?

Colonel HAINS. Yes; plenty of it.

The CHAIRMAN. Heavy timber?

Colonel HAINS. Yes.

The CHAIRMAN. Would not that have to be removed if dredging became necessary?

Colonel HAINS. No, sir; you would only dredge the channel through that lake; you would not go and dredge a mile away from the track of vessels.

The CHAIRMAN. That brings us to a point about which there is a great difference in statement. Some say a channel ought to be dug there and some say that it is not necessary. What do you say about it?

Colonel HAINS. There is some dredging in it in the upper part of it.

The CHAIRMAN. Is there any in the middle or the lower part?

Colonel HAINS. In the lower part I think not. We had profiles of it and they would show.

The CHAIRMAN. How would you make a channel without dredging? Could you make a channel at all without dredging?

Colonel HAINS. Well, you do not have to do any dredging; the depth would be sufficient without any dredging.

The CHAIRMAN. There would be no channel at all; it would be a common depth, as far as the water extended, on the same level.

Colonel HAINS. As far as that depth extended, yes, sir.

The CHAIRMAN. What works are put in on this present estimate at Bohio or in the vicinity of Obispo for the purpose of regulating the flow of the Chagres River into Lake Bohio?

Colonel HAINS. What works in this report are put in?

The CHAIRMAN. Yes.

Colonel HAINS. There are none.

The CHAIRMAN. Ought there to be works?

Colonel HAINS. My opinion is that it would be better to construct Alhajuela dam.

The CHAIRMAN. Do you believe the dam would be safe and controllable without such works; I mean the water supply at the dam and at the spillway and over the whole surface of the lake; do you believe that body of water would be safe and controllable for a canal supply without any regulating works at Obispo or in that vicinity?

Colonel HAINS. Yes; I think it would be safe. The only thing is, there might be some delays to navigation for a short time, but I think with the dam up at Alhajuela the floods can be regulated; that it need cause no wash of material into Lake Bohio at all.

The CHAIRMAN. Now, if there should be a delay of navigation in Lake Bohio from causes that engineers have not removed or have been unable to remove, would not that give a very black eye to a canal as a transit for ships across oceans?

Colonel HAINS. I do not know that that would occur; but if it did occur it would be a disadvantage, but it certainly would not cause delay more than for a few days.

The CHAIRMAN. In this report, however, that matter is allowed for, is especially mentioned as one of the difficulties of the situation. I regard it as an important one. I do not know how you look at it. I should say that a canal that had the reputation for being overwhelmed with floods that come so unexpectedly and rise so quickly, would have a bad reputation for navigation throughout the world. The Suez Canal would get ahead of us on that very question, I suppose.

Colonel HAINS. You know these freshets, such as you are talking about—these big ones—are of rare occurrence.

The CHAIRMAN. About how rare?

Colonel HAINS. There is only one in fifty years where the water has gotten up to nearly 40 feet at Bohio.

The CHAIRMAN. And how about the 30-foot rises?

Colonel HAINS. They do not occur so very often. There has been a rise of about 30 feet; there are several reported, three or four of them, but not a great many; that is, in fifty years.

The CHAIRMAN. But there may be still larger ones than have occurred?

Colonel HAINS. Oh, yes; possibly.

The CHAIRMAN. I will now come to the Alhajuela dam. When you were here before the committee you talked a lot about that, and I will read what you stated. I suppose you remember what you stated very well?

Colonel HAINS. No; I do not recollect it.

The CHAIRMAN. Well, I will read it, just to see how it sounds. When you were here before the committee we were discussing the subject of the third level. The Isthmian Canal Commission proposed to take that out.

Colonel HAINS. Yes.

The CHAIRMAN. And make the Obispo level run clear through from Obispo to Miraflores?

Colonel HAINS. Yes, sir; you spoke of the Obispo level. It is really the level of Lake Bohio; the lake is carried through.

The CHAIRMAN. Obispo and the Bohio level are the same?

Colonel HAINS. Yes, sir.

The CHAIRMAN. Then they pass through the Culebra and the Emperor cut?

Colonel HAINS. Yes, sir.

The CHAIRMAN. I will read from your statement as given before the committee at that time:

The CHAIRMAN. But I am speaking of the necessity of raising a dam or barricade there to obtain the result, on the one hand, of impounding the waters, and, on the other hand, of getting the river up to the lake level. The height of the dams would be about the same, I understand, in both cases?

Colonel HAINS. About the same in both cases.

The CHAIRMAN. When you take *the canal at the third level* the dam at Alhajuela is as important a factor as the dam at Boca San Carlos is when you want to get the level of the river up to the level of the lake. Do you catch my idea? If you have the third level in the Panama Canal to be supplied by water impounded above the dam at Alhajuela, that is as vital a factor in the operation of the canal upon that level as the dam at Boca San Carlos is to the attaining of the lake level at that point.

Colonel HAINS. Yes; *I think it is just as vital.*

The CHAIRMAN. They are both vital.

Colonel HAINS. Yes, sir; but I think we will have to use the Alhajuela dam anyway, no matter what level you adopt.

The CHAIRMAN. Why?

Colonel HAINS. Because I think you will need the lake up there at Alhajuela to help regulate the floods of the Chagres and supply water for the *canal in the dry season.*

The CHAIRMAN. So you count that *as part of the expenditure*, whether they bring water to the third level or the second level?

Colonel HAINS. Yes, sir; *I consider the dam up there as necessary, no matter what level you adopt at Panama.*

The CHAIRMAN. You would undertake to control the water at Alhajuela and also down at Bohio?

Colonel HAINS. Yes, sir.

The CHAIRMAN. At both points?

Colonel HAINS. Yes, sir; I think you have got to have a dam at both places in order to regulate the floods.

The CHAIRMAN. Is that because the floods are so severe—so high?

Colonel HAINS. Yes, sir. You have got to store up a great deal of water, and I think the Bohio Lake alone will not be large enough to store up all water in excess of that which is discharged from the spillway.

The CHAIRMAN. You think that lake would not be large enough to accommodate it?

Colonel HAINS. I think not.

Have you changed your opinion on those subjects?

Colonel HAINS. Not for that particular plan. That discussion refers to the French plan. This one is modified somewhat. They had a different spillway from what we have. We have a spillway over the dam at a place called Gigante. They had a spillway there, but they had another one on the other side of the locks.

The CHAIRMAN. Now, have you a spillway at Gigante or other places that will so control the waters of the Chagres as that they can be taken care of in the highest of floods and also will furnish a sufficient supply of water to the canal in the lower stages of water?

Colonel HAINS. I think the plan that we have got will accomplish the purpose; but, as I said, as an individual I prefer the other dam at Alhajuela, also, in order that the floods of the Chagres River may be reduced about nearly one-half. If you keep a large pool—it is not a pool—a large hollow space up there above the Alhajuela dam into which the waters when the river is in freshet can be stored during the time of the heavy rainfall, you will only have to take care of about a little more than one-half that in Lake Bohio, and I think for that reason the other dam at Alhajuela would be an advantage, but I am not sure that it would be an absolute necessity.

The CHAIRMAN. Now, the Commission in their report state that there may be times in dry seasons when the dam at Bohio and the spillway or the dam at Gigante will not retain within Lake Bohio water enough for navigating the lake, and also that in case of an increase of commerce, where there are more lockages than are supposed to be (five each way during the day is the basis on which this is made), that it would be necessary to have a dam at Alhajuela to apply to for the purpose of reenforcing the waters of Lake Bohio. Do you concur in that opinion that times may occur in the dry season such as that?

Colonel HAINS. Yes, if the commerce should become very large; but there is no trouble up to about 10,000,000 tons per annum.

The CHAIRMAN. Whenever that time occurs, if it ever does occur, it will become necessary to make an expenditure to construct a dam at Alhajuela?

Colonel HAINS. I would make that expenditure immediately.

The CHAIRMAN. You have not done that in this report?

Colonel HAINS. No, sir; that is not estimated for, but I would prefer it individually.

The CHAIRMAN. About what would be the cost of it?

Colonel HAINS. About two millions and a half of dollars.

The CHAIRMAN. So that is an element in the successful operation of the Panama Canal, in case of extreme dry weather and also in case of increase of commerce, that has to be most likely provided for?

Colonel HAINS. Well, it may or may not.

The CHAIRMAN. But if it ever becomes a necessity, then the expenditure has to be made?

Colonel HAINS. Yes, sir.

The CHAIRMAN. Well, in projecting, in a conjectural way, the cost of the canal, and the cost of its maintenance, would it not be fair to include this estimate as a part of the expense that the Government would have to sustain when they took charge of this canal and undertook to operate it for the benefit of the commerce of the world?

Colonel HAINS. Well, I can not speak for the other members. I am speaking now for myself.

The CHAIRMAN. Oh, all the time. I do not want you to speak for anybody but yourself. I am not examining the Commission, I am examining Col. Peter C. Hains, and I know him and have perfect confidence in every word that he says.

Colonel HAINS. Well, as I said before, I think it would be an advantage to construct the Alhajuela dam in the beginning as a part of the system, because you could control the freshets better.

The CHAIRMAN. Do you not contemplate the Alhajuela dam as becoming a necessary part of this canal, sooner or later?

Colonel HAINS. Well, as I said before, if I was constructing it I would do it right from the start.

The CHAIRMAN. That is all I wanted to know about that. Then it ought to be included in the estimates, \$2,500,000.

Now, we have been trying to get at the items that comprise the maintenance of this canal, of these two canals, and I have not been able to ascertain exactly what they were, except in regard to what I call the maintenance of way in the Greytown Harbor. Can you give the items that enter into these estimates where you make a distinction of more than a million dollars in maintaining one canal over the other?

Colonel HAINS. They are in the files of the Commission which have not been published. We worked up very much in detail all the items that would go to make up the total for maintenance and operation. We divided that into several classifications. There was, first, the engineering department. There was the sanitary department, and there was the navigation department, and I do not remember what all, but we took those, and we organized a complete force. There were a great number of tugs that were necessary, pilots, and directors of the

different branches, you know, and the thing was worked out in great detail, and we talked about putting this in the body of the report, and we came to the conclusion it would be better to put it on the files of the Commission.

The CHAIRMAN. Well, we will just have to refer to it, then. We have no chance of examining upon it. I do not know what the items are.

Colonel HAINS. I will look and see if it is one of the appendices, and which one it is. I guess you better go on and I will look this over more carefully presently.

The CHAIRMAN. I want to ask you one question more, and I think that is as far as I will go with you. I want to know whether the waters that pass through Lake Bohio and over the Gigante Spillway, and down into Pena Blanca Swamp, and some other swamps, the names of which I can not remember, return to the Chagres River?

Colonel HAINS. I think they would, unless there were some embankments to keep it out.

The CHAIRMAN. The project of this canal is that they do return?

Colonel HAINS. Part of it would.

The CHAIRMAN. And would have to be taken care of?

Colonel HAINS. By embankments at the side of the canal.

The CHAIRMAN. Also by cutting a ditch?

Colonel HAINS. Yes; in some places we would have to cut what they call a diversion.

The CHAIRMAN. What would be the banks necessary below Bohio? I will take the left bank of the canal first. What would be the length of the bank necessary to keep the waters of the Chagres from plunging back into the canal?

Colonel HAINS. I do not remember what the length of that is.

The CHAIRMAN. Several miles, is it not?

Colonel HAINS. Well, it is not many miles—between 5 and 6.

The CHAIRMAN. Now, we will turn to the other side, the right bank, first premising that from Bohio down to Gatun that the canal as projected by the Isthmian Canal Commission and also by the Panama Company is in or along the bed of the Chagres River from Obispo down to Gatun; is that a fact?

Colonel HAINS. Yes, but there is a difference between the two plans. The French plan proposed to send some of the surface water down on the right-hand side and the remainder on the left. In our plan we have put it all on the left.

The CHAIRMAN. Put it all through the Gigante Spillway?

Colonel HAINS. Yes, and none goes on the other side.

The CHAIRMAN. And it would come back to the canal at Gatun or in that vicinity, about opposite Gatun, unless you fenced it out. That is your plan?

Colonel HAINS. Well, if there was no embankment there it would tend to run in, but we have embankments all along our line where necessary.

The CHAIRMAN. I understand that you have projected them there, and I merely want to get at the length and the height of them and the width of them.

Colonel HAINS. I can not answer that now without looking at the maps.

The CHAIRMAN. Where would the material have to come from with which to make those embankments?

Colonel HAINS. I think you could get it out of the excavation.

The CHAIRMAN. Clear down to Gatun?

Colonel HAINS. Yes, as far as it will go.

The CHAIRMAN. What has become of the banks that were put there by the canal company? Have they not disappeared to a large extent?

Colonel HAINS. Not all of them.

The CHAIRMAN. To a large extent.

Colonel HAINS. Some of them have disappeared.

The CHAIRMAN. What has become of them?

Colonel HAINS. In some places they have washed back into the excavations and in other places they have filled up.

The CHAIRMAN. And in other places they have gone out into the swamps, have they not?

Colonel HAINS. Perhaps, some.

The CHAIRMAN. And in some places they have actually sunk into the earth, have they not?

Colonel HAINS. Yes; but you will find that everywhere in those countries.

The CHAIRMAN. Yes, if you find the ground soft enough. But you do not propose to let it stay there; you want to have something there to resist the inflow of the waters. Now, take the right bank. You have got to keep the river—they call everything a river down there—out of the canal, also on the right bank of it down to the bend below Gatun in the direction of Colon, and also along that stretch. What do you do with the waters of the Gatun?

Colonel HAINS. I don't remember whether the Gatun is carried along on the outside, or whether it is taken into the canal; but the Gatun is not a large stream, you know.

The CHAIRMAN. It is a torrential stream, is it not?

Colonel HAINS. Well, the significance of that term would not be of special importance as applied to that there, Senator.

The CHAIRMAN. Is it a very insignificant stream?

Colonel HAINS. It is; yes, sir; a rather small stream. It empties into the Chagres River, you know.

The CHAIRMAN. The Chagres is a small stream above Obispo, isn't it, especially above Alhajuela?

Colonel HAINS. It is not a large stream anywhere from its mouth up during a good portion of the year, three or four months.

The CHAIRMAN. Well, it is big enough to be taken care of, this Gatun River—I call it Gatun; Gatuncillo is the way they call it, I believe—it is large enough to be taken care of, and the question is whether it is taken care of by being swung off into the bay back of Colon, or whether it is carried into or across the canal.

Colonel HAINS. I think that it goes down in its own bed to near Gatun. It then falls into the bed of the Chagres, and after following it a short distance is diverted eastward of the canal.

The CHAIRMAN. Then it gets back into its old bed.

Colonel HAINS. Yes; and then out into the bay.

The CHAIRMAN. Well, now, all of that country is depressed, is it not—low as compared with the sea level.

Colonel HAINS. Well, yes; the most of it is, but there are hills around there.

The CHAIRMAN. I mean from Monkey Hill toward Colon.

Colonel HAINS. Yes; from there down it is mostly low.

The CHAIRMAN. So low that it is covered with a great deal of water in the rainy seasons?

Colonel HAINS. It is swampy.

The CHAIRMAN. Now, as to the seasons, just one more question. I will not go into the Bay of Colon because I suppose Senator Harris will probably look after that, but the seasons in Nicaragua, on the coast of the Caribbean Sea, are not divided into wet and dry seasons, as I understand it.

Colonel HAINS. It is all wet.

The CHAIRMAN. It rains every day almost in the year?

Colonel HAINS. Pretty near.

The CHAIRMAN. Like it does in Hawaii. At Panama the seasons are very distinctly marked, are they not?

Colonel HAINS. Oh, yes.

The CHAIRMAN. There are five dry months and seven wet months.

Colonel HAINS. Between three and five. It does not often run up as high as five, from three to five months of dry weather.

The CHAIRMAN. Four and a half of dry weather and the balance of it is wet?

Colonel HAINS. Yes.

The CHAIRMAN. And that is uniform over the entire Isthmus?

Colonel HAINS. Pretty much.

The CHAIRMAN. About the hygienic matters, and so forth, I wish that Senator Harris would examine you, as he is more familiar than I am, particularly about the taking care of the health of Panama and Colon, and what is necessary to be done there, if anything.

Senator HANNA. Before you pass to that, I have something that I would like to ask. I have been reading the testimony here of Mr. Plume, which is new to me. It is with reference to these embankments that you have been talking about, the disappearance of the banks which are constructed by the Panama Canal Company after the lapse of time. That is owing to certain conditions and certain results, and to peculiarities that you have described, which would be applicable to all of the banks built on the Nicaragua route, would they not?

Colonel HAINS. Oh, we have a great many worse places than that on the Nicaragua route.

Senator HANNA. Places where it would take a good deal of filling, and to keep filling, to get a foundation. Now, Mr. Plume says that his business has been the building of railroads and canals, and he has done work in Mexico and Cuba and Central and South America and also in Colombia. His position at the time was trackmaster of the Panama Railroad Company. He says that he was there from 1883 to 1888. Further along in his testimony, speaking of the Culebra cut, in the building of the railroad, he says:

The CHAIRMAN. You have to excavate Culebra hill?

Mr. PLUME. Yes.

The CHAIRMAN. Is that the hill you speak of as being watery and full of springs?

Mr. PLUME. Yes, sir.

The CHAIRMAN. What kind of soil is it?

Mr. PLUME. It is the worst I ever saw.

The CHAIRMAN. What do you mean by the worst?

Mr. PLUME. It is a material that is going to be very expensive and very hard to handle. I will explain it to you.

The CHAIRMAN. Wait a moment. You mean hard to handle in digging, or do you mean that it is going to stay there after it is dug?

Mr. PLUME. It won't stay there; it is going to slough off.

The CHAIRMAN. Why?

Mr. PLUME. The rainy season will saturate the earth and it will all slough off.

The CHAIRMAN. Did it do so while you were there?

Mr. PLUME. Yes; we had a cut right alongside of where the canal was going to be built and it sloughed off, not only over the top of our track, but we found it was going to be so expensive to move it that I cut the track away there and laid another one. And a year or so afterwards the same thing took place and I laid another track, and where the present track is there are two underneath.

Further along he says:

Mr. PLUME. Yes. The canal had commenced to slough off before I left there. When I was there at Culebra that week my house was up on the hill about 400 to 500 feet from the canal, and I got up one morning and come out and the land had gone off and left a crack there 2 to 3 feet wide, and I did not say anything, but I knew what it was. It had sloughed off into that canal. The whole side of that mountain is going down into that canal. The farther down they go, the more it will slough. Why, our little railroad cut went off 6 feet to 1; it is perfectly flat that way.

The CHAIRMAN. Being on an elevation of 6 to 1, you say your cut went off; that is the way you express it?

Mr. PLUME. Yes.

Then further in his testimony this occurs:

The CHAIRMAN. What kind of material is above the blue clay that slides off?

Mr. PLUME. It is the worst kind of mud, like putty.

Referring to that experience in the work done by the Panama Canal Company, they had some difficulties of that kind?

Colonel HAINS. Yes; with the top surface.

Senator HANNA. He left there in 1888. You are familiar with the conditions since 1888 up to the present time?

Colonel HAINS. Yes, sir.

Senator HANNA. Have the conditions been changed as to verifying his predictions as to the filling up of the canal from sloughing off of any of these banks?

Colonel HAINS. There has been enough to show that he is entirely mistaken in his prediction. There has been sloughing off. We went over it. This sloughing had taken place on the side of the hill, for a comparatively short depth, I do not know how much, but not to a great depth, and the reason of it is explicable and easy enough to a person who would think about it. If the top soil was a little porous and would allow the water to get into it, it would strike an impermeable clay below, and if that is on an inclination as a matter of course it would slide. I have seen slides here at Mount Vernon.

Senator HANNA. Well, looking toward the completion of the cut by the canal company, what is your judgment about those difficulties being overcome?

Colonel HAINS. They can hardly be classed as difficulties. We will just remove the stuff that slips off and the firmer stuff will not slough.

Senator HANNA. Mr. Plume goes on and states further:

I have been up the Chagres River as far as Las Cruces. The canal company started to make a dam across the Chagres.

The CHAIRMAN. Where?

Mr. PLUME. Above Las Cruces, where the valley is narrowest away up there; to make an earth dam

The CHAIRMAN. Yes.

Mr. PLUME. Well, you know how much an earth dam will stand?

The CHAIRMAN. I don't know anything about it, but I want you to tell me.

Mr. PLUME. Why, an earth dam won't stand anything.

Is that correct from an engineering standpoint?

Colonel HAINS. That an earth dam will not stand anything?

Senator HANNA. That is the testimony.

Colonel HAINS. I should not regard that as correct.

Senator HANNA. He further says:

The CHAIRMAN. You say they started to make a dam. Did they get it completed?

Mr. PLUME. Well, when I left there they hadn't it one-quarter completed. They were going to make a very large dam, they told me 35 feet high.

The CHAIRMAN. What became of it?

Mr. PLUME. I don't know, sir.

The CHAIRMAN. You haven't been back?

Mr. PLUME. They were running over there, taking the earth down this valley I was telling you about, Imperador and those places, and they were running it over there by trains.

The CHAIRMAN. Is that Las Cruces above Obispo?

Mr. PLUME. Oh, it is above Gorgona; it is this side of Obispo.

The CHAIRMAN. I don't know what "this side" means.

Mr. PLUME. Well, the Atlantic side.

The CHAIRMAN. Is it higher upstream or not?

Mr. PLUME. No, sir; Las Cruces is lower down the stream.

The CHAIRMAN. It is between Obispo and Colon?

Mr. PLUME. Yes.

The CHAIRMAN. How far below Obispo is it?

Mr. PLUME. Oh, it must be in the neighborhood of 10 miles.

The CHAIRMAN. What was the object of putting that dam there?

Mr. PLUME. They wanted to make a reservoir to feed the canal. If they had started the dam farther down, where the valley is wider, there might have been a little chance to get water. You understand the mountains keep coming together and they make a pocket away up in there, and this pocket commences this side of Las Cruces, so they started a dam the other side of Las Cruces.

Is that the preliminary dam to control the flood?

Colonel HAINS. I don't know what dam he refers to.

Senator HANNA. I will read further:

The CHAIRMAN. You will say "this side." I wish you would describe it.

Mr. PLUME. The Atlantic side.

The CHAIRMAN. Very good. Now, it is very important that this committee should know what is the character of the soil along the banks of the Chagres River from Obispo toward the Pacific, or rather Obispo up the stream.

Mr. PLUME. It is all mud soil, and it washes a great deal.

The CHAIRMAN. Mud soil, you say?

Mr. PLUME. Yes; nasty, dirty, clay soil that washes a great deal. It has made bars just below our Barbacoa bridge and farther down in the bed. The French engineers have always said that the Chagres never will not do to go into that canal, and they commenced before I left, about 3 miles above Colon, to diverge the Chagres River off to the eastward. We moved our track over about 200 yards, and they came up here with a dredge to our tracks and built a bridge, and I put our tracks back again over this bridge so that it left their dredge the other side.

Do you know anything about that work and what it was done for?

Colonel HAINS. No, sir.

Senator HANNA. Continuing he says:

The CHAIRMAN. You say 3 miles above Colon?

Mr. PLUME. About 3 miles above Colon. It is between Colon and Gatun, and Gatun is 7 miles.

The CHAIRMAN. They wanted to divert the Chagres River?

Mr. PLUME. Yes.

The CHAIRMAN. And they commenced building that diversion there then?

Mr. PLUME. Yes.

The CHAIRMAN. Dug it out?

Mr. PLUME. Excavated with excavators and a dredge, too.

The CHAIRMAN. And you had to have a railroad bridge put across that excavation?

Mr. PLUME. They put a railroad bridge on the line of our track, and I threw our track back over this bridge.

The CHAIRMAN. While they were excavating you moved your track out of the way?

Mr. PLUME. Yes.

The CHAIRMAN. And when they completed the excavation you put your track back again?

Mr. PLUME. Yes.

The CHAIRMAN. And they put the bridge there?

Mr. PLUME. They put the bridge there.

Now, the inference is that the preliminary work they did in building that dam has been abandoned or the material all washed away under the flood of the river, and, of course, it would wash down the river, and the amount of excavations, of filling they put in there, would account somewhat, would it not, for the deposit in the lower part of the river, if that was the case?

Colonel HAINS. If that was the case, yes, sir; but I don't know about this particular dam that he is talking about.

Senator HANNA. I am reading his testimony and he seems to make a point of that.

Colonel HAINS. I don't know what he means.

Senator HANNA. You have been up the Chagres River.

Colonel HAINS. Yes, sir.

Senator HANNA. Does your judgment correspond with that of Mr. Plume with reference to the character of soil, that it is nasty, dirty clay soil, and washes a great deal?

Colonel HAINS. My observation shows that the banks are varied. There is clay and sandy material in some places, and it will wash, and in some places it stands, but it is not essentially different from most rivers, and after you get up about, well, some distance near the site of the Alhajuela dam, the material is much harder and there is a great deal of it that is solid rock, solid rock running right down vertical for 100 to 150 feet. Some of the most beautiful scenes are to be found along there, where the rock has scoured out underneath.

The CHAIRMAN. Scoured out by the action of the river?

Colonel HAINS. Yes.

Senator HANNA. In your judgment as to the construction of the Bohio dam, which is to be slack water, say, some 10 or 12 miles, as the testimony has been given here, do you believe that any appreciable quantity of silt would be deposited in Lake Bohio so that within twenty years it would fill it up?

Colonel HAINS. Fill up the lake?

Senator HANNA. Yes.

Colonel HAINS. No, sir.

Senator HANNA. Testimony was given here by a naval officer to this effect: That at some point on the canal, after going down through the soil 8 or 10 feet, they had struck a material, which he called a volcanic rock, that, after tests made for blasting it, they found that it was so porous and soft that dynamite would not dislodge it, and that in order to take out that rock they would have to build cofferdams and cut it out with some sort of machinery, to remove it at all, and owing to these difficulties encountered they had virtually abandoned the work; he describes it as being 4 or 5 miles in length. They had abandoned it for future consideration. Did you ever hear of any such condition?

Colonel HAINS. Never heard of it before.

Senator HARRIS. Did the Commission give much study to the sanitary conditions of the Isthmus of Panama, extending back into the past any considerable period?

Colonel HAINS. Well, I could not say that we did; at least I did not. I confined myself more particularly to the engineering branches, but I do think the sanitary conditions are better; the conditions for maintaining the health of the people that work there are better at Nicaragua than at Panama. My judgment is based chiefly on our own experience. Of our men employed there very few got sick at Nicaragua, but a much larger percentage of those employed in Panama did get sick.

Senator HARRIS. Well, one reason which might account for the difference in favor of Nicaragua as against Panama is the very fact that you mentioned a while ago, that at Panama there is a distinct wet and dry season, while at Greytown, in the swamp, there it rains nearly all of the time.

Colonel HAINS. That applies only to the eastern side.

Senator HARRIS. I am speaking of the swamp portion, of course.

Colonel HAINS. But our men kept well on the western side also.

Senator HARRIS. The western side, I assume, is comparatively open, elevated country, where the winds prevail and the conditions are naturally healthy.

Colonel HAINS. Well, so far as the appearance of the country is concerned, it is not materially different from what it is on the other part of the Isthmus, nor Panama.

Senator HARRIS. But at Panama, as you know, ever since the Chagres was used as a transit route, running away back into the early fifties, there has been what has been known as the Chagres fever.

Colonel HAINS. Yes, sir.

Senator HARRIS. And also a great deal of yellow fever; in fact the impression exists, I believe, that yellow fever is always more or less in existence.

Colonel HAINS. There was yellow fever in Panama while we were there.

Senator HARRIS. Were you there in the dry season?

Colonel HAINS. Yes, sir.

Senator HARRIS. Is that in the city of Panama?

Colonel HAINS. Yes.

Senator HARRIS. What is the population of the city of Panama, approximately?

Colonel HAINS. Twenty to thirty thousand.

Senator HARRIS. It is a walled city and pretty compactly built.

Colonel HAINS. It is compactly built. I don't remember of any walls.

Senator HARRIS. The old walls were in existence when I was there, and I supposed they were still there, especially on the sea front.

Colonel HAINS. Oh, yes; there is a wall on the sea front.

Senator HARRIS. Well, Colon is a town of 5,000, possibly.

Colonel HAINS. No; I should not think Colon was much more than over 500 to 1,000.

Senator HARRIS. Well, during the time when it was used as a transit—and I say by the Chagres and then afterward when the railroad was built and the sanitary conditions were reported always very bad—it was supposed to have caused a great loss of life to build the railroad. Now, Mr. Morison yesterday, I believe, stated that he regarded it as

necessary to take up the sanitation of the entire country between Colon and Panama, including the city of Panama. Do you concur with that opinion?

Colonel HAINS. Yes; I think it would be necessary; but I think if that was done the conditions would be very much improved.

Senator HARRIS. We undertook the sanitation of Santiago de Cuba?

Colonel HAINS. Yes, sir.

Senator HARRIS. And after a great expense and a good deal of time we improved the conditions there very materially. Do you think Panama would be somewhat similar—a somewhat similar problem?

Colonel HAINS. Yes; I should think so. Panama is a very old place, you know; it is the oldest town almost on this continent, and there were some settlements there within twenty-five years after the discovery of America.

Senator HARRIS. It is one of the two or three oldest towns, I believe, on the continent.

Colonel HAINS. And it is proverbially dirty.

Senator HARRIS. Well, the problem of thoroughly cleaning out and establishing good conditions in Panama would be a very serious one, don't you think?

Colonel HAINS. I think it would. I don't know just exactly what we would have to do, but I am satisfied something will have to be done in order to improve the sanitary conditions there in case that should be the line adopted by the Government.

Senator HARRIS. Well, one of the principal features of the problem of that kind would be the establishment of thorough drainage in the first place.

Colonel HAINS. Yes.

Senator HARRIS. That would require tearing up the streets more or less and the removal of all cesspools and all of that kind of thing.

Senator HANNA. May I ask what right the United States Government would have to do that.

Senator HARRIS. That is just exactly what I am going to get at. How far would the center of the city of Panama be from the canal?

Colonel HAINS. I should judge—from the center of the city—a mile or perhaps a mile and a half. I do not think it is more than that.

Senator HARRIS. It is so near to traffic, to say nothing of the workmen along the canal, that it would render it absolutely necessary that the city of Panama be cleaned so that it would not be a source of infection of any kind?

Colonel HAINS. I think that would be a necessity.

Senator HARRIS. So that some negotiation would be necessary with the Colombian Government by which we could undertake that task?

Colonel HAINS. Yes; I should so regard it.

Senator HARRIS. We would have no authority?

Colonel HAINS. Yes, sir.

Senator HARRIS. The Commission made no allusion to that necessity, nor made any estimate for the general sanitation of the route from Colon to Panama.

Colonel HAINS. Well, we call attention to the necessity of sanitary measures being adopted there.

Senator HARRIS. As I understand it, you call attention to sanitary measures being adopted to protect the health of men in construction

and along the line at work, but I do not recall anything with reference to these sources of disease which exist.

Colonel HAINS. We do not say anything about the sources of disease.

Senator HARRIS. These infected spots, you might say.

Colonel HAINS. I presume the one infected spot there would be Panama itself, and I should think that would be the worst spot to deal with.

Senator HARRIS. And we would have to obtain the right—well, that would involve the whole police regulation of the city, and the government of the city practically, would it not?

Senator HANNA. Is not that a political question?

Senator HARRIS. That is what I am afraid of. I am afraid that we would be involved in politics. Well, it is a very serious question which has got to be met and it will involve a very difficult diplomatic question.

Colonel HAINS. Well, I should think you would have to do the same thing to a certain extent at Greytown.

Senator HARRIS. Well, we will come to Greytown directly.

Colonel HAINS. But it is a more healthy place.

Senator HARRIS. There is no estimate for that, and I suppose nobody has offered an opinion as to what it is.

Colonel HAINS. Yes; we have an estimate for sanitation. That is included in the contingent item.

Senator HARRIS. Of the city of Panama?

Colonel HAINS. We take in the whole thing. In our estimate there is 20 per cent for contingencies and sanitation, and all that sort of thing.

Senator HARRIS. As I understood you just now, you meant that your estimates did not apply to this city, but to the maintenance and looking after the welfare of the men along the line of the work.

Colonel HAINS. Well, I answered the question with reference chiefly to the details, whether we had made an estimate in detail for the sanitary measures that are necessary to take. I say we did not; but we took the 20 per cent of the total cost of the work to include whatever measures might be necessary.

Senator HARRIS. Do you remember that any discussion was had as to the sanitation of the city of Panama?

Colonel HAINS. Nothing except in a general way. It was generally understood that Panama was an unhealthy place.

Senator HARRIS. You do not recall any discussion with regard to such measures as compared with Santiago de Cuba, for instance?

Colonel HAINS. We have often spoken of it as a necessity, but as to the details of how it should be undertaken, I do not think that it has ever been discussed.

Senator HARRIS. Of course at Greytown there is a mere hamlet there now; as I understand it, it is a small place.

Colonel HAINS. Yes.

Senator HARRIS. And, as you say, it is a healthier country naturally; and Greytown, I believe, would be included practically in the jurisdiction of any grant given to construct or control the canal necessarily?

Colonel HAINS. Well, would not Panama also?

Senator HARRIS. Well, I would like to know whether you think we could govern and control a city like Panama?

Colonel HAINS. I think we ought to have control of it without a doubt.

Senator HARRIS. It is a political question. It is the capital of that State, I believe. At Greytown, of course, the difficulties would be very slight in comparison with the problems at Panama?

Colonel HAINS. Yes.

Senator HARRIS. It is not an infected spot?

Colonel HAINS. No, sir; Greytown is a perfectly healthy place.

Senator HARRIS. And, as I understand it, the rainfall there keeps the waters of the swamp from becoming stagnant; they are fresh practically all of the time?

Colonel HAINS. You seldom have mosquitoes at Greytown, even in the dry season.

Senator HARRIS. Now, the vital point in both of these routes, from an engineering standpoint, I think, is conceded to be the dam at Bohio or the dam at Conchuda.

Colonel HAINS. Yes.

Senator HARRIS. They determine the summit level and of course everything rests upon that level being regulated. Are you pretty fully satisfied with the suggested plan for the dam at Bohio?

Colonel HAINS. I think the plan that has been suggested by the Commission is satisfactory and will meet all of the conditions. I think it is probable, and very probable, that a much cheaper dam can be built and still answer the same purpose.

Senator HARRIS. Of course, you regard the Commission as right in recommending this as the best?

Colonel HAINS. That was at the time regarded as the best. You see, these borings came in rather late and we got up that plan for that dam; but before any dam was built down there, I suppose the engineer that undertakes to build it would want to take a thousand more borings.

Senator HARRIS. He would want to investigate much more carefully the character of the bed rock?

Colonel HAINS. Yes, sir.

Senator HARRIS. Its depth and its continuity?

Colonel HAINS. And he will vary his plan of dam according to the information he gets from those borings.

Senator HARRIS. These borings seem to have been taken (really I think that accounts for some of the confusion) at irregular distances apart; sometimes 50 and sometimes 200 feet, and in either case there are possibilities of insufficient determination of the continuity of the bed rock, as you just stated.

Colonel HAINS. Yes.

Senator HARRIS. That they would have to be much more closely and carefully examined. At the site of the French dam, which was above this, the French bored down to what they considered a sufficient foundation, which was a bed of clay?

Colonel HAINS. Yes, sir.

Senator HARRIS. Your Commission penetrated that and found, to use an expression that I think one of them made use of, a bottomless gulf of sand. That, of course, seems that they did not reach the bottom. Do you remember anything of that kind?

Colonel HAINS. We found rock nearly everywhere where we bored.

Senator HARRIS. I am speaking of the French dam site, which is at the narrow part of the valley above this.

Colonel HAINS. I don't remember whether we found rock everywhere there, but there are other places where we found rock.

Senator HARRIS. But you found that sometimes, at some spots, evidently, the borings did not reach rock, from the impressions that I have received.

Colonel HAINS. I think that is so, perhaps, but the borings there show——

Senator HARRIS. I am not speaking of yourself, I am speaking altogether of your examination of the French site; and that was the reason why your commission abandoned the French site, which otherwise would have been desirable, being narrower.

Colonel HAINS. I think I understand what you mean. We abandoned the French site because it was very deep there to rock. We got this site which requires a longer dam from our borings. That apparently was the best place that we could find for that kind of a dam, so that you could put a masonry core right down to the rock and extend it clear up to the top of the dam.

Senator HARRIS. The theory of this dam is a masonry core which will entirely cut off all penetration of the water from the bed rock to the surface.

Colonel HAINS. There can be no seepage there through that. It is possible that a better site can be found. It is also possible that between these borings there may be cavities, fissures in the rock, which may be filled with permeable material.

Senator HARRIS. That can only be determined by much more care and a much larger number of borings?

Colonel HAINS. Yes.

Senator HARRIS. You think that the use of the impenetrable core is a necessary part of the dam?

Colonel HAINS. Well, that dam is a good solution of this question?

Senator HARRIS. That is what this dam is supposed to give?

Colonel HAINS. Exactly, but that is a very expensive dam. My own impression is, from the borings that we had, that it will not be necessary to make so expensive a dam as that.

Senator HARRIS. In the feature of any dam do you think that an impenetrable core is necessary?

Colonel HAINS. No, sir; not in every case.

Senator HARRIS. That you can build a dam there of so-called rock fill and earth that would answer?

Colonel HAINS. Yes; I am not certain about that, but I think it is quite likely that our borings, when they are made in sufficient number, may show that these beds of sand are only pockets, and that it is not a strip of sand that runs along in an old bed of the river and communicates with the river above and below. I think you may find that these are pockets that start out from nothing and run, one above the other, in different places.

Senator HARRIS. Would not your borings have determined entirely the fact whether or not these permeable beds were connected with the river water?

Colonel HAINS. They did not.

Senator HARRIS. Mr. Morison, in the article which he has written in the proceedings of civil engineers, said that the fact was demonstrated because wherever a pipe was driven down to this permeable bed of material, the water raised in the pipe to the level of the river.

Colonel HAINS. Yes; that probably shows there was communication with some part of that particular stratum.

Senator HARRIS. You are talking about there being pockets entirely cut off?

Colonel HAINS. What I mean to say is, that strata may run out before you get to your dam, or before you get to the lower part of your dam.

Senator HARRIS. Don't you think there is evidence to show that there is connection somewhere between the river and these masses of permeable material and these strata of permeable material?

Colonel HAINS. It looks that way, but I am not satisfied that it is necessarily so, except in some places.

Senator HARRIS. The evidence is that way so far as we have evidence?

Colonel HAINS. Yes.

Senator HARRIS. Have you any recollection of the ends of your borings showing that in the borings they found—of course the water would stand at level of the river in the borings. Do you remember anything said as to that when the borings were made?

Colonel HAINS. That is a point we always wanted to find out, how the water stood in each boring that was taken. I think, in a report of the man who had charge, he gave the stand of the water inside; and as I remember it, I think some of them showed water higher, than it did in others, and did not always stand at a level of the river.

Senator HARRIS. They might extend, of course, higher than the river, though I should hardly think that any would be below the level of the river.

Colonel HAINS. I think some of them were.

Senator HARRIS. Well, assuming that those masses of sand and gravel are connected with the river somewhere, do you regard any plan of dam as secure in a work of this character which permits the filtration of water in a dam or through the dam?

Colonel HAINS. No, sir; if a large number of borings should show that it communicates by a large area of permeable material, I would rather adopt this plan.

Senator HARRIS. Or at least a plan with an impervious core to bed rock?

Colonel HAINS. Yes, sir.

Senator HARRIS. You think a cheaper dam could be built. Would you recommend, with the evidence you have before you, a dam which does not carry its foundations down to bed rock?

Colonel HAINS. I would recommend this, with a masonry core to rock, but I would recommend that further investigations be made before the plan is absolutely settled.

Senator HARRIS. But unless the conditions should be found to be much more favorable than indicated so far, then this would be the safest plan. Is that your conclusion?

Colonel HAINS. It is pretty hard for me to express my ideas there just exactly. I regard this as a perfectly practicable and safe dam, but I am inclined to think you will be able to construct this cheaper dam that Mr. Morison refers to. I have looked over his paper. We have never had it before the Commission, but I think that can be constructed and would answer the purpose as well as this.

Senator HARRIS. In your estimate for this dam, according to Mr. Morison, no allowance was made for a temporary dam above it during its construction?

Colonel HAINS. No sir; not in this work.

Senator HARRIS. Mr. Morison, in his figures, allows nearly \$2,000,000, I believe, for a temporary dam?

Colonel HAINS. No; it is pretty nearly one million.

Senator HARRIS. Oh, I beg your pardon. Yes; about \$800,000.

Colonel HAINS. Yes.

Senator HARRIS. He thinks that would be necessary in order to complete this dam. Now, there are some unusual difficulties in the construction of this dam. As an engineer, you think it presents some unusual and very great difficulties?

Colonel HAINS. Yes.

Senator HARRIS. The sinking of caissons to that depth and the connecting of the caissons so as to be impervious to water between the caissons is a very difficult process. A large part of it, as shown on this drawing here, of course is slanting—the bed rock. The caissons have to be sunk down so as to have a uniform bearing and set straight. I suppose that would be necessary, would it not?

Colonel HAINS. Oh, yes; there is no doubt about that.

Senator HARRIS. And you think it would be safe to permit the upper corner of a caisson to rest upon the rock and have the lower corner some distance above the bed rock?

Colonel HAINS. No, sir.

Senator HARRIS. You think it would be better engineering to sink the upper corner down to a point where a level bed and bearing would be had for that caisson?

Colonel HAINS. To sink it right into the rock a short distance, so that there would be a bearing all over.

Senator HARRIS. There seems to be a mistake, then, made in this drawing. It shows the caisson raised at the upper corner, and the lower corner is considerably above the bed rock.

Colonel HAINS. Is that made that way?

Senator HARRIS. Yes.

Colonel HAINS. Then that is a mistake.

The CHAIRMAN. I understood you to say that the lower corner of the caisson was to be supported by concrete.

Senator HARRIS. That is after you got your excavation all done, then your caisson is filled with concrete.

Colonel HAINS. I would want the caisson to go down into bed rock.

Senator HARRIS. I call your attention to that, because Professor Haupt spoke of that as being a mistake in the drawing. He said it ought to go down to a bearing, and the upper part of it be excavated to a uniform bearing. Mr. Morison said he thought that was not essential, and that this map was correct.

Colonel HAINS. I never noticed that before. Yes, I see what you mean. But I would want to carry that down.

Senator HARRIS. It ought to be sunk lower on the upper side and kept perfectly straight, and not excavated until you got level bearings all around.

Colonel HAINS. Yes. Oh, yes; I would not regard caissons safe without it, particularly in such a place as this.

Senator HARRIS. Have you worked out any plan after, for example, you had sunk one of these caissons, just how you would get the other caisson sunk down alongside of it so as to make a water-tight joint.

Colonel HAINS. The idea was to have circular spaces about

a foot in diameter on each side that would be afterwards filled with concrete and thus form a key.

Senator HARRIS. You would have a cylinder that you would fill?

Colonel HAINS. Yes; fill this cylinder with good, strong concrete.

Senator HARRIS. Of course that all involves this true sinking of caissons, that they must be straight?

Colonel HAINS. Yes.

Senator HARRIS. Well, there is some 1,314 feet given here as the distance in which the pneumatic process will have to be used.

Colonel HAINS. Yes; but that is nearly all on dry ground, I think, is it not?

Senator HARRIS. I don't know as to that.

Colonel HAINS. It is in this part here. You see here is the river, and this space over here——

Senator HARRIS. The borings indicate, however, that there would be water, you see.

Colonel HAINS. Oh, yes; there would be water, but it is not like in the river, where there is running water.

Senator HARRIS. Of course the Chagres River is only a small part of it?

Colonel HAINS. Yes.

Senator HARRIS. Of course the men will have to be worked under the atmospheric pressure regardless of the water; the water cuts no figure in the matter.

Colonel HAINS. That is the difficulty with part of the work, working the men in the caisson.

Senator HARRIS. We have had it in evidence here that about the greatest depth to which the pneumatic process has been used is from 110 to 115 feet in bridge piers. A large part of this, I should say, from looking at the map, is from 125 to 128 feet, and the rest gradually reduces.

Colonel HAINS. Yes.

Senator HARRIS. What length of time do you think a man could work in a caisson under that atmospheric pressure?

Colonel HAINS. Well, I have never done any work of that kind practically, but I should think three or four hours would be about as much as a man could stand.

Senator HARRIS. Don't you think that two hours would be about as long as a man could stand it without a shift?

Colonel HAINS. I think it is very likely.

Senator HARRIS. And the bad effects are sometimes permanent.

Colonel HAINS. Yes; it very often kills a man.

Senator HARRIS. And he becomes rapidly crippled and disabled. I mean that a man is not able to simply recover after a little rest and go back to work, but he is very frequently permanently disabled.

Colonel HAINS. Yes; there is no doubt about that.

Senator HARRIS. And it requires a superior class of workmen.

Colonel HAINS. A very superior class of workmen.

Senator HAWLEY. How do you mean?

Senator HARRIS. Superior mentally and physically.

Colonel HAINS. Oh, they have to be physically in excellent condition.

Senator HANNA. How much of that work will have to be done on the Nicaragua dam?

Colonel HAINS. There is not so much.

Senator HARRIS. In the dam at Conchuda the greatest depth is 82 feet?

Colonel HAINS. Yes.

Senator HANNA. What I want to get at is, the only difference between the effect upon the human body would be with reference to the increased depth. Is that it?

Colonel HAINS. That is it.

Senator HARRIS. The greater the depth, the greater the pressure.

Senator HANNA. And the more difficulty.

Senator HARRIS. And there is a very great difference in the length?

Colonel HAINS. But there is one thing to be considered about that. It is a very different thing when you are working one of those caissons out in a stream where you are liable to go along a day and then have your work interfered with for three days.

Senator HARRIS. That is, it is more difficult to place the caisson?

Colonel HAINS. Yes; it is very much more troublesome.

Senator HARRIS. That is, of course, true, that in handling a caisson in water it is more difficult.

Colonel HAINS. In some of these caissons, if it is found, for instance, that these sand strata are only pockets; you may not have the pressure due to a column of water 128 feet.

Senator HARRIS. Well, the evidence, as you said a while ago, all is that the water will be there.

Colonel HAINS. Yes.

Senator HARRIS. I should imagine from what has been said of this geological valley that we must assume that this will all be worked under water, not worked in a current?

Colonel HAINS. Yes; that has got to be assumed.

Senator HARRIS. The dam at Conchuda is less than half the length of the dam at Bohio, is it not?

Colonel HAINS. I don't remember the length. What is the total length?

Senator HARRIS. It is not more than 1,500 feet from the hills on one side to the hills on the other.

Senator HANNA. What part of that Bohio dam is to be built on caissons?

Senator HARRIS. At the Conchuda site this report says the greatest depth to hard rock is 82 feet; the portion of the dam across the river and the swamp, total distance 731 feet, will set below low water, with caissons placed close together, with the joints between them sealed; so that that is the length of the pneumatic work to be done at Conchuda. The total length of the dam at Conchuda is 1,271 feet, the report says.

Colonel HAINS. And at Bohio it is about 3,000 feet.

Senator HARRIS. Yes; about 3,300 feet. Now, of course this dam and the Gigante spillway, and the diversion of water at the Pena Blanca swamp are practically all part of one great system; that is, it involves the holding of the water and the taking care of the flood.

Colonel HAINS. Yes.

Senator HARRIS. And the waste way. I forget just what the figures are; I do not suppose you remember them, but they run up to some eleven millions of dollars altogether; that is, the cost of this work.

Colonel HAINS. Well, the cost of this work, I think, is about eight

millions of dollars altogether at Bohio, and at Conchuda it is about six millions and a fraction.

Senator HARRIS. It is eight and a fraction, and six and a fraction. The total for the dam and the waste way at Conchuda is \$6,062,000, and in this case at Bohio it is a little over \$8,000,000.

Colonel HAINS. That is for the dam and spillway, but that does not include the taking care of the water below, which has necessarily to be done at Pena Blanca swamp. There is some work to be done down there. That is not a very large item.

Senator HARRIS. This involves what is called a flight of locks.

Colonel HAINS. Yes.

Senator HARRIS. That is, two locks, one opening into the other.

Colonel HAINS. Yes.

Senator HARRIS. With a maximum lift of 45 feet each.

Colonel HAINS. Yes.

Senator HARRIS. Do you think that the construction of locks in that way is a much more difficult operation than the construction of a single lock?

Colonel HAINS. No; I should not regard the construction any more difficult, except that the work is larger and more concentrated.

Senator HARRIS. Of much greater magnitude?

Colonel HAINS. That is it.

Senator HARRIS. And the liability to accidents and injury increases in proportion to the magnitude of the work, as a rule, does it not?

Colonel HAINS. Yes.

Senator HARRIS. About what is the maximum lift of locks now in use?

Colonel HAINS. I guess the maximum lift of a large lock is that up at the Soo, which is about 18 feet.

Senator HARRIS. Then locks of this lift are beyond present engineering experience?

Colonel HAINS. I do not know of any locks in existence with 45 feet lift.

Senator HANNA. Nor of 36 feet?

Colonel HAINS. No, sir.

Senator HARRIS. But this has seemed to me, and I want to know if I am correct, that a flight of locks, one immediately after the other, involves troublesome features that a single lock would not?

Colonel HAINS. Well, I should not think so, where the foundation is what it is there. It is a good foundation.

Senator HARRIS. Now, there is one of the features of this work. Right there is a solid rock for the whole of those two locks.

Colonel HAINS. Yes, sir.

Senator HARRIS. You made borings enough to demonstrate that?

Colonel HAINS. A large part of that has been excavated; a great deal of it has been done by the French.

Senator HARRIS. Now, the next important thing—and some of the gentlemen who have testified regard it as the most important thing—to be done is the summit cut at Culebra. You recognize the necessity of protecting that clay from the influence of water?

Colonel HAINS. Yes.

Senator HARRIS. And you estimate, I believe, \$9,000,000 for a retaining wall?

Colonel HAINS. 'I do not know how much it is, but we have a retaining wall on both sides of the canal throughout the whole of that Culebra cut.

Senator HARRIS. You said a while ago, I think, that the sloughing was confined to the surface material?

Colonel HAINS. Yes.

Senator HARRIS. The surface soil?

Colonel HAINS. Yes.

Senator HARRIS. Now, Mr. Morison testified the other day that he went down into one of these borings in the cut which are supposed to go down nearly to the bottom.

Colonel HAINS. Some of them go clear to the bottom.

Senator HARRIS. And he got some clay from away down in the pit, which dissolved at once when put into water. Have you any recollection of testing any material of that kind?

Colonel HAINS. I have no recollection of testing any material of that kind at Panama. I came across some pretty bad material on the other route in Nicaragua. We had stuff that we could not cut through except with a diamond drill, and in cutting through with a diamond drill it came out in pieces of from 1 foot to 3 or 4 feet in length. That stuff was put away in boxes, and after it had dried it all split up, split across.

Senator HARRIS. The action of drying is a different thing from what I am talking about.

Colonel HAINS. I was going to say and then you put this in water and it all falls to pieces, and yet we thought at first that was solid rock.

Senator HARRIS. The idea has been that there is a great deal of material in the Culebra cut which dissolves readily and slides under the influence of water.

Colonel HAINS. Well, that may be so, but you can go along there and look at it exposed to the weather—and there are pretty heavy rains there sometimes—and it seems to stand very well.

Senator HARRIS. There has been no sliding in the lower part?

Colonel HAINS. No, sir.

Senator HARRIS. Of course, there is no cut on the Nicaragua line where sliding has ever been contemplated as a serious element of danger?

Colonel HAINS. Yes.

Senator HARRIS. What cut is that?

Colonel HAINS. It is beyond lock No. 4.

Senator HARRIS. That would be after you enter the river?

Colonel HAINS. It is between the lock and the river. There is a place there where we found rock and then clay and then rock again and then clay again.

Senator HARRIS. A strata of rock and a strata of sand and then again a strata of rock and a strata of sand?

Colonel HAINS. A strata of rock and then clay, then rock and clay again. We regard it as a very bad cut and instead of treating it, with slopes of four on one, we put in slopes of one on one and treat it as clay.

Senator HARRIS. What is the depth of that cut?

Colonel HAINS. There is one piece down over 200 feet.

Senator HARRIS. And the extreme length of it?

Colonel HAINS. I can not tell you the whole length of it; we only had a small number of borings.

Senator HARRIS. The profile would show the length of that cut?

Colonel HAINS. I think it is something like, say, about half a mile.

The CHAIRMAN. Is that above Boca San Carlos?

Colonel HAINS. It is between Lock No. 4 and the river. There are two bad places that we go through. There are three heavy cuts on the Nicaragua route. One is at Tambercito, but that is an easy matter. There we get good, heavy, solid rock that we can use, and it is excellent material for making concrete. That is the heaviest cut that we have got. Beyond Lock No. 4 there are two more heavy cuts, and that is where our borings showed material not of the kind that we would like to have.

Senator HARRIS. Is the ridge sharp or is it very flat between the distances to which this 200 feet of depth would extend, probably?

Colonel HAINS. Well, it is not as sharp as Tambercito.

Senator HARRIS. But the whole length of the cut is only about half a mile.

Colonel HAINS. I can not say exactly. I thought you would have the profiles here of that, or I would have brought them over with me, so that I could show you.

The CHAIRMAN. Is that place that you speak of, the cut of half a mile through this depth, above Boca San Carlos?

Colonel HAINS. Oh, yes. Lock No. 4 is above the mouth of the San Carlos River, and this is between Lock No. 4 and the river.

Senator HARRIS. Lock No. 4 is not far from the dam, and the dam, of course, is considerably above Boca San Carlos.

The CHAIRMAN. It is in the new part of the canal made necessary by taking the dam from San Carlos up to Conchuda.

Colonel HAINS. Yes.

Senator HANNA. Is that considered in that cut as much of a proposition to handle as in the Culebra cut?

Colonel HAINS. I think it is. I would rather take the Culebra.

Senator HARRIS. Do you mean to say that you would rather tackle the Culebra cut, which is 8 miles long and running up as high as 300 feet in depth, than to tackle a cut half a mile long where the maximum depth is 200 feet?

Colonel HAINS. No, sir, if the conditions otherwise were similar, but I regard the conditions here as worse than at the Culebra cut. We have more definite knowledge of the Culebra, and much of it is already done.

Senator HARRIS. Well, the depth and the length are part of the conditions.

Colonel HAINS. I do not refer to those conditions; I refer to the conditions of the material.

Senator HARRIS. The character of the material?

Colonel HAINS. Yes.

Senator HARRIS. Is the sand the trouble there?

Colonel HAINS. The clay that underlies the rock.

Senator HARRIS. That is what makes danger in that cut?

Colonel HAINS. There is clay that underlies the rock. I do not think the sand amounts to much, but there is clay that underlies the rock, and for that reason, instead of making a steep cut, we sloped it in slopes of 1 on 1.

Senator HARRIS. Where the cut is short and the height not great, the making of a slope is not a matter of any great difficulty.

Colonel HAINS. The whole of the Culebra cut is cut with slopes of 1 on 1.

Senator HARRIS. I understand. That is supposed to be the object of the slope, but it is cut in steps.

Colonel HAINS. With a slope of 1 on 1.

The CHAIRMAN. Now, you propose to undertake this difficult piece of work in order to get your dam up the river from the mouth of Boca San Carlos up to Conchuda, and you want to carry that dam up from Boca San Carlos to Conchuda because the depth of the water at Conchuda is less; I mean the depth of the rock is not so great as it is at San Carlos. What is the difference in feet between the two?

Colonel HAINS. Pretty nearly 40.

The CHAIRMAN. That is the depth at Boca San Carlos?

Colonel HAINS. The depth at Boca San Carlos from the water surface is about 120 feet, and at Conchuda about 82 feet deep.

The CHAIRMAN. From the sea level how is it?

Colonel HAINS. Well, the surface of the water is about 60 feet above sea level, so that with reference to the sea level it would be at San Carlos about 60 feet; something like that.

The CHAIRMAN. And at Bohio 128 feet. That is the difference.

Senator HARRIS. I have one more general question that I wish to ask you. Is there any engineering work on the Nicaragua line that is not easily within the limits of present engineering experience and knowledge?

Colonel HAINS. On the Nicaragua?

Senator HARRIS. Yes.

Colonel HAINS. I think not.

Senator HARRIS. There is no work there, either in the way of dams or locks or cuts, that involves any new and untried problems?

Colonel HAINS. No, sir.

Senator KITTREDGE. Is there on the Panama?

Colonel HAINS. I don't think there is in Panama unless it is this dam.

Senator HARRIS. Well, I thought we had discussed that, and I will put the additional question and refer to what Mr. Morison says. Mr. Morison thought it involved "new and untried problems," the construction at this dam.

Colonel HAINS. Yes.

Senator HARRIS. And you agree with that?

Colonel HAINS. Yes; I agree with that.

Senator HANNA. Would you consider these untried problems as problems that could not be overcome in engineering?

Colonel HAINS. No, sir.

Senator HARRIS. Is there anything now among engineers that is not regarded as possible, given money enough and time enough?

Colonel HAINS. Very little.

Senator HANNA. Do you believe generally that the Bohio dam, as recommended by the Commission, can be constructed for the amount of expenditure estimated?

Colonel HAINS. Yes; I think it can.

Senator HANNA. Your part of the work on this Commission was confined to Nicaragua—that is, you were on the committee that examined Nicaragua more specially?

Colonel HAINS. More especially, because we had to divide up the work.

Senator HANNA. And after a thorough and complete examination, your committee, conversant with the facts existing on that route, and after consultation with others and your own observation on the Panama route, you still recommend the Panama route at the price at which we can buy it?

Colonel HAINS. Yes, sir.

The subcommittee then (at 4.30 o'clock p. m.) took a recess until Friday, February 14, 1902, at 10.30 o'clock a. m.

STATEMENT
OF
COL. OSWALD H. ERNST
BEFORE THE
SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,
UNITED STATES SENATE,
CONSISTING OF
SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Tuesday, February 18, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman) and Hanna.

Also Senators Millard, Kittredge, and Hawley, members of the committee.

Col. Oswald H. Ernst appeared and was duly sworn by the chairman.

STATEMENT OF COL. OSWALD H. ERNST.

The CHAIRMAN. I would state that I have a general knowledge of Colonel Ernst's opinion from a statement made before this committee at a previous time, and I want to call his attention to it now, and I will ask you, Colonel Ernst, to look it over and see if you have any changes to make in any of the statements you made then; that is, whether you have come to different conclusions about any particular fact that is contained in your statement.

Senator HANNA. You are an engineer by profession, Colonel Ernst?

Colonel ERNST. Yes.

Senator HANNA. In the employ of the Government?

Colonel ERNST. Yes.

Senator HANNA. How long have you been engaged in that vocation?

Colonel ERNST. Since 1864.

Senator HANNA. How long have you been connected with the United States Engineering Corps?

Colonel ERNST. Since 1864.

Senator HANNA. You are a member of the Isthmian Canal Commission?

Colonel ERNST. Yes.

Senator HANNA. Have you ever been a member of any other commission making these explorations on the Isthmus?

Colonel ERNST. No.

Senator HANNA. This is your first experience?

Colonel ERNST. Yes.

Senator HANNA. You went to the Isthmus?

Colonel ERNST. Yes.

Senator HANNA. I understand that the Commission subdivided their work for their more detailed examination. To which route were you assigned?

Colonel ERNST. Panama.

Senator HANNA. Did you make any examination or survey or go over the work of the Nicaragua line?

Colonel ERNST. Yes.

Senator HANNA. You went there and went over the line.

Colonel ERNST. Yes; we all went together.

Senator HANNA. You signed this report and afterwards the supplementary report.

Colonel ERNST. I signed both of them.

Senator HANNA. After a thorough examination. In the regular report, the synopsis of which we have here, in closing the Commission uses this language:

There are certain physical advantages, such as a shorter canal line, a more complete knowledge of the country through which it passes, and lower cost of maintenance and operation in favor of the Panama route, but the price fixed by the Panama Canal Company for a sale of its property and franchises is so unreasonable that its acceptance can not be recommended by this Commission.

Did you understand that to mean that had the price fixed by the Panama Canal Company for the sale of its property been reasonable and satisfactory that you would have recommended the Panama route at that time?

Colonel ERNST. Yes; I did so understand it.

Senator HANNA. Therefore when the price of \$40,000,000 was submitted to the Commission, in your supplementary report you recommend the acceptance of that proposition for the reason stated in this paragraph?

Colonel ERNST. Yes.

Senator HANNA. Therefore after a full investigation by the Commission and taking the status as it is to-day, everything considered, which route, in your judgment, is the best for this Government to construct and operate a canal across the isthmus?

Colonel ERNST. As it stands, without knowing what the Central American Republics will do——

Senator HANNA. In all of my questions I leave out the question of title and concession, because that is another matter.

Colonel ERNST. I think the Panama line is the one most advantageous to the United States.

Senator HANNA. Now, you can do it a good deal better, I think, if you will tell in your own way your reasons for arriving at that conclusion, instead of answering questions.

Colonel ERNST. The Panama line is shorter, 49 miles long as against 183 miles. It is straighter. It has a curvature of some 770 degrees as against some 2,300 on the Nicaragua line. It is lower, having four locks as against eight. It will cost \$1,350,000 a year less to operate.

Senator HANNA. The Commission in its report stated it \$1,300,000.

Colonel ERNST. Well, that was a clerical error. It ought to have been \$1,350,000, but we will say \$1,300,000. I have no objection to leaving it at that, but the computation, as we worked it all out, was \$1,350,000. The difficulties of execution I do not regard as much greater on one line than on the other. There are difficulties on both. The Bohio dam on the Panama line offers a greater difficulty than the Conchuda dam on the Nicaragua line. On the other hand, the Nicaragua Canal level has to be maintained for many miles above the surface of the country by embankments. Those embankments are to hold the water from 10 to 25 feet above the general level of the country. They have got to be constructed on, in many cases, marshy soil. Now, we can do that; there is no doubt it can be done, but there are difficulties. There is no use in thinking that we can avoid difficulties on either line.

The healthfulness of the Nicaragua line is better than that of the Panama line, but I am not at all satisfied that we can not very much improve the state of affairs on the Panama line with our modern appliances and with the lessons that we have been taught, the necessity of it, and I should not venture to go into the Nicaragua line without taking equal precautions. I think it is absolutely necessary to have a rigid sanitary system there, with a police system to enforce the rules, and to introduce a copious water supply and take all the sanitary precautions that are necessary in those unhealthy countries. They are both unhealthy: there is no doubt about that.

Senator HANNA. Now, about the Bohio dam. That is a matter about which there has been a great diversity of opinion in the testimony given here, and I would like to have your opinion about the construction of that dam—as to whether or not it is feasible. The two dams have been discussed. Mr. Morison gave testimony that, in his judgment, he thought that upon further examination that in the work of construction he had faith to believe that a core dam would not be necessary.

Colonel ERNST. That is the opinion of many very sound engineers.

The CHAIRMAN. Have you seen Mr. Morison's statement in his paper before the American Society of Engineers?

Colonel ERNST. Yes; I have seen that. These French engineers did not propose to put a core down at all; they did not know how far the rock was; they did not find it. We did. They proposed an earth dam and Mr. Morison prefers an earth dam. The majority of the Commission felt that that left a danger that it was desirable to avoid, if possible. There is no use of taking unnecessary risks, and we thought it was possible to close that geological valley absolutely with an impervious core, going down to bed rock, and then there is no question but what there is under that dam an impervious core. That was the most conservative way, at least for the estimate, but at the same time a very much more expensive way, and the Commission felt that it was desirable to put in an estimate for the most effective and the most expensive dam.

Senator HANNA. But when it came to the time for construction and further investigation conditions may be found to exist that would change the opinion in reference to that.

Colonel ERNST. That is possible.

Senator HANNA. And, of course, there would be further investigations made before any work would be commenced.

Colonel ERNST. Yes.

Senator HANNA. Testimony has been given here that the sinking of caissons under the pneumatic process to the depth of 128 feet, which is the depth to rock, never has been reached in engineering experience before.

Colonel ERNST. No; it has not.

Senator HANNA. But that the depth of 110 to 115 feet, reached in the sinking of caissons in building bridge piers, had been successful. Would you anticipate any trouble in going the extra 10 or 15 feet?

Colonel ERNST. There might be trouble; but it was proposed in the Commission, when we were discussing that question, that we could put down cofferdams around that thing and pump down the head, so that in going to 128 feet the head would not be more than these 110 or 112 feet, I believe it is, to which a caisson has heretofore been sunk. There are other methods. There is a method of excavating, as they

do in India, wells, dredging down through the bottom and sinking down impervious material.

Senator HANNA. How would you dredge it?

Colonel ERNST. Sink a well down and dredge the material up. After you get down as far as compressed air will take you, then dredge through wells. That is not as perfect a way, but suppose we get that masonry dam down 100 feet or 110 feet—and there is precedent for that—you have 110 feet of material to dam back any leakage, and there is just a diaphragm under this core where there might be some leakage. It reduces the amount of seepage enormously to get it down even that far, even if you have to stop there.

Senator HANNA. You went up the Chagres River Valley?

Colonel ERNST. Yes.

Senator HANNA. How far?

Colonel ERNST. Went up altogether about 15 miles. We went several miles above the Alhajuela dam site.

Senator HANNA. Mr. Menocal and Mr. Haupt gave testimony that it was their belief that the silt from that river at flood time would eventually fill up this lake.

The CHAIRMAN. Would make it necessary to dredge it.

Senator HANNA. I think Mr. Menocal said in twenty years it would be filled up and the only way it could be avoided was by dredging.

Colonel ERNST. There is practically no silt in that river. It is a pure, clear-water river running over gravel. The banks are all gravel and the bed is of gravel everywhere above Alhajuela and down to the neighborhood of Obispo, and then small quantities of silt begin to make their appearance, and there is some below that.

Senator HANNA. At very high water are the banks of such material that they would wash into the river and so that the river would carry with it a good deal of silt?

Colonel ERNST. No, they are not; very little silt. Mostly above Alhajuela they are rocky bluffs; very little silt.

Senator HANNA. Then you would not anticipate any difficulty from that feature?

Colonel ERNST. Not at all. There is as little silt in that river as any river I ever saw.

Senator HANNA. Now, with reference to the Culebra cut, there were some difficulties from slides in the beginning of that work, were there?

Colonel ERNST. Yes.

Senator HANNA. Do you think the work done in later years has demonstrated the fact that there is no future trouble likely to arise from slides in finishing the cut or in the operation of it when it is finished?

Colonel ERNST. I think none that are serious. There is liability to have a little sliding, but nothing but what you would expect in any cut. It is not a rock that will stand, it is an indurated clay.

Senator HANNA. The testimony was given here also that at some parts in the canal, nearer to the Colon end on the east side, I understood it, there had been found at a depth of 8 or 10 feet under the surface, a volcanic rock which was very porous and spongy and they had found it impossible to blast it, and that the only way they could remove it would be to build cofferdams and cut it out by some machinery. Did you ever hear of anything of that kind.

Colonel ERNST. I don't know anything about that, and I never heard of it.

Senator HANNA. You spoke of the curvature. The sharpest curvature is in the harbor of Colon.

Colonel ERNST. Yes.

Senator HANNA. You widen the channel there so that there is no difficulty. Now, in the canalization features of the two canals, what is the special difference between the curvature of the two routes?

Colonel ERNST. We have some seven hundred degrees on the Panama and over two thousand degrees on the Nicaragua line.

Senator HANNA. That is a summary is it, or taking the average?

Colonel ERNST. There is a statement here on page 99 of the report of the curves on the Panama line, with the radius that each has. It is as follows:

Number of curves.	Radius.	Number of curves.	Radius.
	<i>Feet.</i>		<i>Feet.</i>
1	19,629	4.....	8,202
1.....	13,123	2.....	6,562
4.....	11,483	1.....	6,234
15.....	9,842	1.....	3,281

I will read now the number of curves, with their radius, on the Nicaragua route:

Number of curves.	Radius.	Number of curves.	Radius.
	<i>Feet.</i>		<i>Feet.</i>
2	17,189	2.....	5,289
8.....	11,459	1.....	5,209
4.....	8,594	2.....	5,066
1.....	8,385	1.....	4,982
2.....	7,814	3.....	4,911
1.....	7,759	1.....	4,297
5.....	6,876	1.....	4,175
2.....	5,927	4.....	4,045
16.....	5,730		

On the Panama line there are twenty-nine turns, with a total length of 22.85 miles, and the total curvature is 771 degrees. That curve at Colon was put there deliberately in order to take advantage of a point, to get in behind it, so that the harbor, when you get in there, should be better sheltered. It is easy enough to cut that off if you want to.

Senator HANNA. It is easy enough to widen that channel?

Colonel ERNST. It is easy enough to straighten that curve, but we prefer to keep it, because you get in behind the shelter.

Senator HANNA. Well, that difference in curvature and the number of degrees was a factor in your arriving at your judgment as to the desirability of the Panama route, so far as that is concerned?

Colonel ERNST. Yes. All those different matters of construction are summed up in the estimate of cost and the estimate of time. Now, the estimate of cost for the Panama line is about \$144,000,000. I mean to finish it, supposing that we owned it; of the Nicaragua line it is about \$189,000,000. That measures the physical difficulties to be overcome on the two canals. The advantages of the canal after it is finished are, first, the time required to go through, which we estimate on the Panama at twelve hours and on the Nicaragua at thirty-three

hours. That is not allowing anything for night, darkness, winds, or currents, but simply the navigation through a quiet sheet of water. Now, against that time is the distance from this country.

The distance from New York to San Francisco, by way of Nicaragua, is about 500 miles less than by way of Panama, leaving out the length of the canals. The difference in time to go through will depend on whether vessels will navigate at night or not. We could not get any satisfactory figures on the subject of insurance, and that is a matter of opinion, how much more it will cost in the matter of insurance to go through the Nicaragua Canal than the Panama; we could not get any satisfactory figures, so we did not say anything about it in the report. But I think everybody believes that it will cost more. The insurance to go through the Nicaragua will be greater than to go through the Panama. Now, if that insurance is so great that it will compel vessels to tie up at night, it will take three days to go through the Nicaragua instead of one and one-half days. So that it is three days through Nicaragua as compared with one at Panama. There are plenty of vessels in the world that will run 500 miles in a day, and there will be a great many more before we get through with this, so that I do not attach very much weight to the question of time.

I think they pretty nearly offset each other. I do not think it is a very serious consideration, it is not matter that you can reduce to dollars very well, and it is a question of dollars after all, how much it is going to cost, how much to build it, and how much to operate it, and how much time you want to take to get through with it. They are all questions of dollars.

Senator HANNA. Well, the liability to detention, even though the Nicaragua route might be lighted by electricity or gas buoys, would be greater under all existing conditions by that route because in the Panama Canal you can pass through in the daytime.

Colonel ERNST. Yes, the chances of detention, of course, are greater in a long canal. Through the San Juan River is a maximum flow of about 70,000 feet a second. That is equal to the low water discharge of the middle Mississippi River between St. Louis and Cairo, and that is an impediment to navigation. Of course that will not occur all the year round, or very often, but it will occur.

The CHAIRMAN. What are you speaking of, Colonel, I do not hear very distinctly.

Colonel ERNST. The discharge, the overflow of Lake Nicaragua must come down through the San Juan River as far as the Conchuda dam. In fact it goes all the way and we get rid of it at Conchuda. The amount of that discharge, or rather the maximum of it, is 70,000 cubic feet of water a second through the flood seasons, during the high water.

Senator HANNA. What portions of the year do those conditions exist that you call the flood seasons?

Colonel ERNST. Well, there is a rainy season, you know; it is through the summer. Those rains begin in May and last until November or December. October is one of the rainiest months. Probably in October the lake would be full and the overflow would be at the maximum.

Senator HANNA. So that at least half the year that condition of current would exist?

Colonel ERNST. Oh, no; not as much as that. There would be some current.

Senator HANNA. 'It would keep increasing?

Colonel ERNST. Yes. The current I am speaking about now, comparing with the Mississippi River, is the maximum; that does not occur half the year or anything like it. In many years it will not occur at all.

Senator HANNA. Speaking of the question of dollars being the unit, I think you figured the practicability, the feasibility of these two routes on that hypothesis, and you figure that it would cost \$1,350,000 more per annum for maintenance and operation of the Nicaragua route. That capitalized would represent about \$65,000,000 at the Government rate of interest. I take it that the Government bonds can be sold at an interest of about 2 per cent in the market; that would be the rate of interest established as the Government rate. On that basis it would mean a capitalization of \$65,000,000. Now, with reference to the Nicaragua route as to cuts and dams, what engineering and physical difficulties do you find in that route?

Colonel ERNST. Well, the dam is a tremendous dam. Of course, it is a much easier dam to build and a better dam than the Bohio dam.

Senator HANNA. You find the rock nearer the surface?

Colonel ERNST. Yes, and we can make it of masonry without any difficulty. The physical difficulties in building that canal are mainly—well, there are some uncertainties. For instance, we have got a cut there 170 feet deep, where we go down through clay and soft rock a good many feet, and then we come to about 65 feet of solid rock, and then we come to 10 feet of clay again, and after going through 10 feet of clay we come to solid rock again. Now, that is a most extraordinary situation, and that layer of clay 10 feet thick at the bottom of it stands about 10 feet above the bottom of the canal, and the top of it about 20 feet above the bottom of the canal. Now, there is a difficulty. We can make that cut, but it is difficult, and there is an uncertainty, and instead of estimating on a rock cut with a slope of 4 on 1, which we have on other rock cuts, we cut that back to a slope of 1 on 1 in making the estimate to provide for the trouble we are going to have in digging that. That kind of thing occurs on the Isthmus, and that is one of the things that makes that tunnel question so very unattractive to me. Suppose you should find something like that in the tunnel?

The CHAIRMAN. What is the particular difficulty in finding these beds of clay between the rock formation?

Colonel ERNST. If they were perfectly horizontal there would not be any, but the chances are that they are all on an incline and would slip; the whole top of the hill might slip down.

Senator HANNA. As compared with the Culebra cut, what would be the comparative physical difficulties between the two in constructing the two canals?

Colonel ERNST. Oh, I think the Culebra cut would be more difficult.

Senator HANNA. As to quantity of earth removed or what?

Colonel ERNST. Oh, yes, it is enormously greater as to quantity of earth to be removed in the Culebra cut. The Culebra cut comprises nearly half the total excavation of the Panama Canal.

Senator HANNA. Taking the Culebra cut as it exists to-day, to carry it to completion, would you find these physical difficulties or uncertainties more in the Culebra cut than in the cut you have just described?

Colonel ERNST. No, I do not think you would. I do not think there

is anything there quite so uncertain as this, but of course this is so small that you really could not compare those two cuts at all. This is an uncertainty on a very much smaller scale than the uncertainty in the Culebra cut would be. The Culebra cut involves some forty-three million yards of material and if there should be any uncertainty there, it might double the cost of the canal, perhaps.

Senator HANNA. Now, with reference to the harbors, will you just give us your judgment about the relative harbors.

Colonel ERNST. I think we can make a perfectly satisfactory harbor at both ends of both lines—perfectly satisfactory.

The CHAIRMAN. How much time in all have you spent in the Isthmus of Panama? We will call it the Isthmus of Panama.

Colonel ERNST. We were there about three months.

The CHAIRMAN. How much of that time were you in Nicaragua?

Colonel ERNST. About six weeks.

The CHAIRMAN. How much time in Panama?

Colonel ERNST. About two weeks.

The CHAIRMAN. During that time I suppose you confined your observations to the line of the canal and the railroad, and the Chagres River.

Colonel ERNST. Yes; and the outlying work of the Gigante spillway.

The CHAIRMAN. That is 3 miles from Bohio?

Colonel ERNST. Yes.

The CHAIRMAN. You did not travel across the country from Panama to Las Cruces, or any other point across the country there?

Colonel ERNST. No, sir; except in following up that feeder line, we had to go across country.

The CHAIRMAN. You went along right down the river, did you not?

Colonel ERNST. We took horses and went up over the mountain and down through the valleys, an exceedingly rough country we went over.

The CHAIRMAN. That feeder does not follow the course of the river?

Colonel ERNST. No; it runs through tunnels and siphons under the branch valleys.

The CHAIRMAN. Your examination of the river itself and its banks were made in a voyage up and down the river in canoes?

Colonel ERNST. We came down in canoes. We spent a day at Alhajuela; we arrived there one night and spent the night there, and the next morning we took horses and went up the river and that part we examined on foot and on horseback.

The CHAIRMAN. You kept along the channel of the river?

Colonel ERNST. Yes; up on the banks, close to the river.

The CHAIRMAN. You were there in the low-water season?

Colonel ERNST. Yes.

The CHAIRMAN. When the Chagres River was a clear, bright stream?

Colonel ERNST. Yes.

The CHAIRMAN. I have here some extracts from the annual reports of the Panama Railroad Company. I will read from the report of the superintendent for the year 1880. I wish to ask you if you have taken that into your calculations, or any statement like that?

The financial operations and results of the year 1879 are satisfactory, notwithstanding the interruption of our freight traffic during the last month of the year in consequence of the damage caused by floods of November. The Chagres river rose 46 feet in three days, and the freshet was without precedent on the Isthmus.

I will now read from a report of 1881, for the year 1880, the other being for the year 1879:

The work for the first quarter of the year 1880 was performed under many disadvantages, caused by the disastrous floods of November, 1879, which rendered the road impassable for six weeks, during which time freight accumulated to such an extent that to store and care for it properly much of it had to be rehandled several times, adding greatly to the cost of transportation. * * * It should be borne in mind that during the entire year we were engaged in extra work upon wharves and roadbeds damaged by the flood of 1879, at an actual cost of not less than \$35,000.

Were those facts brought to your attention in your examination of this subject?

Colonel ERNST. Yes. I am not quite certain about those figures that you speak of; that is, 46 feet in three days. I have some notice of that flood in this report. I will look at it, if you please, and see what it is about the height. Of course what I said just now to Senator Hanna was with reference to the silt.

The greatest flood which has occurred since the occupation of the isthmus by the Panama Railroad (which covers a period of fifty years), and so far as known the greatest which ever occurred, was that of November 18, 1879. No measurement was made of its volume, but the height which it reached at Bohio is stated upon the authority of Mr. Sosa, a Colombian engineer, to have been 39.3 feet above low water.

That is at Bohio; it may have been higher at Gamboa.

The CHAIRMAN. It might have been higher lower down.

Colonel ERNST. It would naturally get lower as you went down toward the sea. It is very likely it was 46 feet where it joined the railroad line at Gamboa, which is some miles above Bohio; but we took that flood as our standard for comparison.

A comparison of this height with that reached by floods of which the volume was measured (see Appendix D) leads to the conclusion that the maximum discharge at Bohio at the highest point of the flood in 1879 might have been as much as 136,000 cubic feet per second. In reaching this conclusion one of the assumptions is that there was no change in the size of the waterway between 1879 and the dates of the later floods, and that if the same quantity of water had been flowing at the later dates as in 1879, it would have reached the same height. Inasmuch as the size of the waterway was much increased subsequently to 1879 by the excavations of the old company, this assumption gives a result which is certainly not too low. In this, as in all other cases of doubt, the assumptions have been made such as to err on the safe side, if at all. The other greatest floods of which there are records are those of 1885, with a height at Bohio 33.8 feet; 1888, with height 34.7 feet; 1890, with height 32.1 feet, and 1893, with height 28.5 feet. The last two were measured, the maximum discharge in 1890 being 74,998 cubic feet per second, and in 1893, 48,975 cubic feet. Thus it appears that the floods in which the discharge exceeds 75,000 cubic feet per second are of rare occurrence. If the works be so designed that such a flood would produce no currents which would interfere with navigation, and that a flood of 140,000 cubic feet per second, while it might temporarily suspend navigation, would not injure the structure of the canal, ample provision will be made for the flood control of the Chagres.

That is the way we planned those works.

The CHAIRMAN. Then your works were planned with a view that the floods in the Chagres might temporarily suspend navigation?

Colonel ERNST. Yes; that is a possibility.

The CHAIRMAN. That is included in your calculations?

Colonel ERNST. Yes.

The CHAIRMAN. That it might be suspended. Of course that would be as long as the floods would last.

Colonel ERNST. It would be as long as 140,000 cubic feet were flowing; and that amount never has flowed yet, so far as we can tell.

One hundred and thirty-six thousand cubic feet is what we computed might have occurred in 1879, which is the greatest flood known.

Senator HANNA. That is once in fifty years.

Colonel ERNST. Yes; and that to continue any length of time would simply be a convulsion of nature that is not to be expected.

The CHAIRMAN. Now, I will ask you what head your tide gauges show was the highest flood within the memory of man, or within the computation of observers and engineers on the San Juan River about Conchuda?

Colonel ERNST. I will have to refer to some papers. I could not answer that offhand.

The CHAIRMAN. It does not compare with this flood of 46 feet?

Colonel ERNST. Oh, no; there is no such oscillation as that.

The CHAIRMAN. So that in making your calculations for controlling the waters in the San Juan River you would not have to allow for any such flood as recited in that report or in this statement I am reading from?

Colonel ERNST. No, sir.

The CHAIRMAN. Were you at Colon while you were there, and in Panama—I mean in the city?

Colonel ERNST. Yes.

The CHAIRMAN. About what is the population of Panama?

Colonel ERNST. About twenty thousand, I think.

The CHAIRMAN. And about how much in Colon?

Colonel ERNST. About five or six thousand.

The CHAIRMAN. Is there any considerable number of French citizens or people located in Panama or Colon permanently?

Colonel ERNST. Well, I fancy not. Of course, most of the people that we saw were French. They were the officers of the canal company, but I do not think there are many outside of those officials.

The CHAIRMAN. Are there many French residents in that part of the country, in those cities?

Colonel ERNST. I did not see any.

The CHAIRMAN. In the sanitation that is necessary on the Panama route, would you feel that it was safe without including the city of Panama and the city of Colon?

Colonel ERNST. No; I can not say that I think it would be safe.

The CHAIRMAN. How far is the city of Panama from the line of the canal as it is dredged from the bay there?

Colonel ERNST. It is about 3 miles.

The CHAIRMAN. That would be included in the canal limits, if they were 6 miles wide?

Colonel ERNST. I certainly would prefer that they should be included.

The CHAIRMAN. Would you not think that it was absolutely necessary to include it in order to preserve the sanitation, or whatever results might come from sanitation, on the Panama route?

Colonel ERNST. I think the result would undoubtedly be better with it. It is a question of degree. You certainly could not have the same sanitary state there without that city as you can with it.

The CHAIRMAN. That would apply equally well to Colon?

Colonel ERNST. Yes; but Colon is nearly all owned by the Panama Railroad Company, and if you buy that you buy the city.

The CHAIRMAN. Well, I think that is a legal question. Suppose, however, that we bought it and got the title to all the property that

had passed through the hands of the railroad company and under concessions from Colombia, it would be still necessary to have the control of it in order to accomplish this sanitary purpose?

Colonel ERNST. I think so.

The CHAIRMAN. Well, it would be also necessary to have the control of it for police purposes?

Colonel ERNST. Yes, sir.

The CHAIRMAN. What sort of a population is there at Colon and at Panama?

Colonel ERNST. Well, I could not say that it was a very high order of population. I did not come into very close personal contact with it. I would say, however, that they were a rather low order of people, a great many of them. Of course, there are some respectable people there.

The CHAIRMAN. A very mixed population?

Colonel ERNST. Yes, sir.

The CHAIRMAN. They are a turbulent people, too, are they not?

Colonel ERNST. I would say they are; yes, sir.

The CHAIRMAN. Hard to manage?

Colonel ERNST. They are fighting and quarreling all the time; yes, sir.

The CHAIRMAN. And they are insurrectionary? •

Colonel ERNST. Yes, sir.

The CHAIRMAN. We have had several occasions when we have had to send ships of war down there with marines aboard in order to preserve the peace and save the property that the French people have got on that Isthmus, and also to protect and guarantee the sovereignty of the Republic of Colombia over the State of Panama. That is in our treaty.

Colonel ERNST. Yes.

The CHAIRMAN. Now, in making up your estimate of the maintenance of the Panama Canal, the current expenses of maintenance and preservation and protection, etc., I suppose you took all of those elements into consideration?

Colonel ERNST. Yes.

The CHAIRMAN. Did you include the sanitation and the police control of the city of Panama, with 20,000 inhabitants?

Colonel ERNST. We did not in terms. The way we did that was to draw up an organization for the management of the canal, a separate board of control here in this country consisting of five members, a governor on the Isthmus with his staff and office, and then provide for six departments, the engineering department, with all its various assistants and appliances and the material required; the transit department, having charge of the regulation of dues and the transit and management of all pilots and all that sort of thing, and the light-houses; the medical department, charged with the quarantine regulations, the general hospitals and the hospital supplies, the subordinate hospitals, and sanitary inspection; the police department and a law department and a finance department. We had all those worked out in detail, and the medical department was charged mainly with the hospitals and sub-hospitals and the sanitary inspection and the quarantine service. Now, we allowed a force necessary for that, without taking into account any great city.

The CHAIRMAN. You took into account the men who were connected with the operation of the canal?

Colonel ERNST. Yes.

The CHAIRMAN. And the railroad?

Colonel ERNST. And the railroad. The general hospitals, which would be some little way off, probably, from the canal.

The CHAIRMAN. But you made your estimate on the number of men that would probably be employed in the navigation and management of the canal and railroad?

Colonel ERNST. Yes.

The CHAIRMAN. You did not include in it the citizenship of these cities?

Colonel ERNST. No, sir.

The CHAIRMAN. Could you name here the appendix that contains those estimates? We have been very much at a loss to find out about them.

Colonel ERNST. We did not publish those, because it is purely theoretical; we felt that we could not defend every estimate of it. We felt that there were errors both ways. You can conceive of the difficulty of getting up of such an organization at a desk for a great work like that, which must actually be tested and corrected in practice. I mean it must be adjusted. There are many of those items that we felt would err, some on one side and some on the other, and we thought that they would correct each other; but doing it the same for both lines, we thought it was a fair comparison.

The CHAIRMAN. You made a comparison in your own minds, based upon facts that you yourselves had observed on the line or had learned from other sources, but you did not make up an itemized statement and balance sheet between the cost of maintenance on the one route and the other.

Colonel ERNST. Oh, yes; we went through this organization for both canals. Of course, the Nicaragua Canal had the same general control. The governing board in this country would be the same as for the Panama and also the governor and his staff on the Isthmus would be the same and the chiefs of these departments would all be the same. Now, when it came to the number of posts you would have to have for police force, there would be more on the Nicaragua than on the Panama. We would have to have more engineering divisions.

The CHAIRMAN. What I want to get at is whether the items were put down on the list?

Colonel ERNST. Oh, I have got them all, and I would be very glad to show them to you. I have not got them here to-day, but I can bring them if you wish to see them.

The CHAIRMAN. They were not published?

Colonel ERNST. No.

The CHAIRMAN. I would be very glad if you will furnish us with them, because we have had a great difficulty in getting at the items of the estimate.

Colonel ERNST. It is one of those things that we are perfectly aware is open to attack, because they are approximations, but they are identical for the two lines.

The CHAIRMAN. You will furnish them to us?

Colonel ERNST. Yes.

The CHAIRMAN. Then I will not go any further into that question. You spoke with confidence of the ability of the engineers to establish good harbors on both exits of both canals?

Colonel ERNST. Yes.

The CHAIRMAN. You have been abroad and examined the ports, for instance, of Havre, France, and Dover, England, and Calais. Can you name any other English ports that have been entirely artificial in their construction?

Colonel ERNST. Well, Liverpool and Southampton both have to have docks. The case hardly applies here. To dock a ship there they have to take it out of the water, at least take it up into the dock. The entrance to the North Sea channel at Holland is a case of very important artificial harbor work, absolutely artificial. I have examined that.

The CHAIRMAN. Were you ever at Port Said?

Colonel ERNST. No, sir.

The CHAIRMAN. You have studied it however?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Do you recollect the distance from the coast line that the breakwater runs out to the 30-foot curve at sea at Port Said?

Colonel ERNST. I can not state now.

The CHAIRMAN. Is it not 2,230 yards?

Colonel ERNST. I would not like to say.

The CHAIRMAN. I have a statement in the report that I have made here from this committee, and I have taken it from Professor Norse. He is a high authority, is he not?

Colonel ERNST. Yes.

The CHAIRMAN. Of which my remembrance is, and I am not accurate as to the figures—I think 2,230 yards there out to the 30-foot curve, and at Greytown it is about the same number of feet, 3,000 feet; but you do not recall those figures.

Colonel ERNST. No, sir.

The CHAIRMAN. Now, when you know the ground and know the topography of the bottom of the sea adjacent to it, there is no difficulty in constructing a safe harbor or port and entrance to it under ordinary conditions, by engineering skill.

Colonel ERNST. You are speaking of Greytown?

The CHAIRMAN. At Greytown or any other place.

Colonel ERNST. I think there is none at all.

The CHAIRMAN. Those harbors are quite as convenient and quite as safe as natural harbors, are they not?

Colonel ERNST. I think so.

The CHAIRMAN. When you went to Panama and looked over the ground you could see every part of the country because it had been cleared up?

Colonel ERNST. On the line of the canal we could; yes, sir.

The CHAIRMAN. And at Nicaragua you could not?

Colonel ERNST. No, sir.

The CHAIRMAN. Except west of the lake, and there I suppose you could see?

Colonel ERNST. A good deal of it we could; yes, sir.

The CHAIRMAN. So that you could get a more distinct idea of the topography of Panama than you could of Nicaragua just from passing through, examining it in the brief space of time you had to devote to it?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Now, there have been many lines run through

Nicaragua along that line, commencing with the line run by Childs. That was a piece of engineering I have heard very highly applauded by engineers as being exact.

Colonel ERNST. Yes.

The CHAIRMAN. And Childs's survey has been taken as the basis of all the subsequent surveys, so far as his route corresponded with others?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Childs put in a canal there with 17 feet depth of water, a harbor at Brito at the mouth of the little river there.

Colonel ERNST. The Rio Grande.

The CHAIRMAN. No, this way, at the lake—Las Lajas—and then at Greytown, but the bay was there at Greytown when he made his survey at deep water, and his survey included a slack-water navigation of the San Juan River, with dams at all the rapids—three or four dams—and he took his canal out in the vicinity of the mouth of the San Carlos, somewhere, and carried it through that level country down to Greytown. That was a safe canal, was it not?

Colonel ERNST. Well, I do not know about below the San Carlos. I think he would have had trouble below the San Carlos.

The CHAIRMAN. He did not have slack-water navigation below San Carlos, as I remember it.

Colonel ERNST. My recollection of it is that he had, but I may be mistaken.

The CHAIRMAN. But it was considered that that would have been a safe canal, if constructed, for ships drawing, say, 15 or 16 feet of water.

Colonel ERNST. Oh, I think so. I think that Childs would probably have changed his lines a little below the San Carlos, but, while I think so, I repeat that I think it was an admirable plan.

The CHAIRMAN. Have you ever examined the canal across France from the Mediterranean to the Bay of Biscay?

Colonel ERNST. No, sir.

The CHAIRMAN. That has been there for a great many years—a useful canal for a great many years?

Colonel ERNST. Yes, sir.

The CHAIRMAN. The French have made great use of it, carrying ships through with small tonnage?

Colonel ERNST. Yes, sir.

The CHAIRMAN. And then after Childs came Lull, and Mr. Menocal was his chief engineer, and they followed Childs's line, and adopted the slack-water system in that survey down to a point near the mouth of the San Carlos River, if I remember correctly, and then took the line through that low ground around to Greytown where there was still a good harbor or a fair harbor. That canal was 24 or 27 feet deep. I have the data somewhere here, but I have not got it so that I can refer to it just now. That would have been a safe canal, would it not?

Colonel ERNST. I think so.

The CHAIRMAN. Slack-water navigation. And it would have been a very useful canal to the commerce of the world, would it not?

Colonel ERNST. I should think it might.

The CHAIRMAN. With ships of the size then in vogue.

Colonel ERNST. If they had got it done before the ships increased too far. The trouble with all of our great enterprises is that before they are finished they are outgrown.

The CHAIRMAN. Mr. Menocal made another survey on the same line, a low-water survey, for the Government of the United States, do you remember. That followed Lull's line and Lull's plan and the system was the same except that he put in a dam for the purpose of raising the water in the San Juan River to the level of the lake, if I remember it correctly.

Colonel ERNST. That was his high-level plan, I think they called it. He did put in a dam just below the mouth of the San Carlos River to raise the water up to the level of the lake.

The CHAIRMAN. Then the former plan was the low-level plan, and he did not have a dam there to raise the waters of the San Juan to the level of the lake. He still followed the plan of Childs and Lull, so that we have three surveys made upon that plan of slack-water navigation—one by Childs, one by Lull, and then one by Menocal. Then Menocal made another survey for the Maritime Canal Company, and then he put in a dam at Ochoa and ran the water back of the ridges across the San Francisco River and across the rock divide, about 4 miles down to Deseado, and from that into the bay of San Francisco, saving a distance of 13 miles in the line of the canal—of the axis of the canal. That, however, your party did not adopt; you thought that was visionary to some extent.

Colonel ERNST. We thought it was entirely too dangerous.

The CHAIRMAN. Then the Walker survey put in another line after Ludlow's examination of the Menocal lines, which provided for a dam at Boca San Carlos, and they reported in favor of that line as being a permanent, useful, good line; and that line led from San Juan River at or about Boca San Carlos and ran on the low level—what is called the low level—down to Greytown. Has any objection ever been made to the sufficiency of that line, projected and surveyed by Admiral Walker?

Colonel ERNST. Our line is essentially that line.

The CHAIRMAN. I know it is; but to that particular line, have you heard of any engineering objection made to the sufficiency of that line surveyed by Admiral Walker?

Colonel ERNST. Well, there are difficulties in it. I mentioned one difficulty a while ago, about that cut, where we go down through clay.

The CHAIRMAN. That is above Boca San Carlos; that is between lock number 4 and the San Juan River?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Therefore it is above Boca San Carlos; it is higher up the stream than Boca San Carlos?

Colonel ERNST. I can show you much better on the map. There is a place there where it crosses a great depth of sand.

The CHAIRMAN. I know. I am now on the Walker canal, which did not include that cut.

Colonel ERNST. Well, I think it went on that same line to that place; I am not perfectly certain about that. Of course their line was a paper line; they never marked it on the ground. We have marked our line on the ground; have bored right on the ground.

The CHAIRMAN. When Admiral Walker had made his borings at Boca San Carlos and had got a solid rock bottom across, there is a depth of about 90 feet to the rock from the surface of the water. When your Commission got there you examined those borings and that site, and you also put in a line of borings across the San Juan River at Con-

chuda, which is 4 or 5 miles up the San Juan River, and there you got a depth to solid rock across the San Juan River of how many feet?

Colonel ERNST. It is 82 feet.

The CHAIRMAN. That was the deepest place at which you struck the rock on that boring?

Colonel ERNST. Yes.

The CHAIRMAN. And there you put in a number of borings across the river. Do you recollect the distance apart that they were?

Colonel ERNST. About 100 feet. They started it at 100 feet, and if there was any great change, the order was to make it 50.

The CHAIRMAN. Where you had a doubt you put down an intermediate boring?

Colonel ERNST. Yes, sir.

The CHAIRMAN. And there you found a line you were satisfied with as the basis of a canal?

Colonel ERNST. Yes, sir.

The CHAIRMAN. And in order to get the lower depth of water, or rather in order to get the rock nearer to the surface, you preferred to construct 4 miles or more of canal from the point opposite to or at Boca San Carlos up to Conchuda, you thought that the construction of that canal was compensated by the fact that you had got up nearer to the surface and a solid foundation with which you were entirely satisfied, and you are still satisfied with it?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Now, we will turn to Bohio. When you got there you say the French had already made borings, but had never touched the rock at all, as I understand it.

Colonel ERNST. Not in the deep part of the valley.

The CHAIRMAN. Had they made any borings?

Colonel ERNST. The number that they furnished to us was 21. I say 21. I would like to refresh my memory as to numbers—yes, 21.

The CHAIRMAN. At Bohio you encountered what all of you term a geological valley. Have you a judgment that you are willing to express in regard to the circumstances under which that valley originated, as to what caused it?

Colonel ERNST. I have no theory on the subject.

The CHAIRMAN. You don't know whether it is a fissure caused by some convulsion of nature, or whether it was worked out by the attrition of water?

Colonel ERNST. No, sir.

The CHAIRMAN. Most likely it would be by water, would it not?

Colonel ERNST. Well, I don't know. The whole country is volcanic. I have a shark's tooth that came out of the Culebra cut 140 feet down.

The CHAIRMAN. Now it might have been then by some earthquake or volcanic action?

Colonel ERNST. Yes. I do not know what it is.

The CHAIRMAN. But it is a very deep, geological valley?

Colonel ERNST. Yes.

The CHAIRMAN. And narrow?

Colonel ERNST. Yes.

The CHAIRMAN. And it is filled up with various strata of material that has gone into it. Now, what has carried that material into that cut except water?

Colonel ERNST. Well, I don't know. I presume it was water.

The CHAIRMAN. Have you any doubt that it was water?

Colonel ERNST. No; I have no reasonable doubt. I have not much opinion on the subject. I am very uncertain about it. I have no reason to doubt that it was water.

The CHAIRMAN. So that there had been a deposit made there in your judgment by deposits from water from time to time, sometimes with clay and sometimes of sand and some time of gravel, until the geological valley has been filled up to the bed of the present Chagres River, and the Chagres River runs on top of the deposit?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Now, through that deposit do your borings indicate that the stratification of these different formations is continuous and regular or is it broken?

Colonel ERNST. Very irregular. There is no law by which you can determine the situation anywhere except just where you are examining.

The CHAIRMAN. Where your auger goes down.

Colonel ERNST. Yes.

The CHAIRMAN. Mr. Morison mentions in his paper the fact that some of these strata which are pervious to water, through which water percolates, appear above the Bohio dam in the bed of the stream, or may appear. I do not think he stated it as a positive fact—outcropped, we will put it.

Colonel ERNST. Yes.

The CHAIRMAN. He determined the fact that the strata is identical with certain work they did there by driving pipes in the earth and finding that the water in those pipes would rise to the level of this strata in the river, so that penetrable stratum continues in through that valley and you do not know to what extent?

Colonel ERNST. No, sir.

The CHAIRMAN. Have you ever adopted as an engineering proposition, with sufficient degree of certainty in your own mind as to advise your friends or your Government to spend money on it, the practicability of a clay dam such as the French proposed at that place; have you an opinion on that subject such as you would be willing to advise us to vote money upon a clay dam at Bohio, where you locate the dam recommended by the Commission?

Colonel ERNST. I would not build the dam that the French recommended with that foundation. I think it is entirely feasible to build an earth dam. That is what you refer to?

The CHAIRMAN. Yes.

Colonel ERNST. An earth dam with clay puddling—that is the way they are made water-tight. Clay is not a good material alone, and sand alone is not a good material, but sand and clay mixed together will make what we call puddling, and that makes a water-tight material.

Senator HANNA. Do you allude to the kind of dam that Mr. Morison suggested, what we call a rock-and-clay dam, proposed to have rock facings?

Colonel ERNST. Well, that is a method of constructing a dam. That plan of Mr. Morison I have no doubt is feasible. There is a question of how much seepage there is going to be. Of course, he reduces that very much by the enormous extent of his dam. He makes a dam, you know, as thick as a mountain, almost.

The CHAIRMAN. Yes; with 7 acres of clay between the rock fills above and below.

Colonel ERNST. Yes.

The CHAIRMAN. And then with piling—joined piling—driven across intermediate between the rock fill dams.

Colonel ERNST. Yes, sir.

The CHAIRMAN. Just on the subject of rock fill dams there, Mr. Morison's plan proposes to face his dam upstream with what we call a rock fill, of course made tight by the introduction of clay and sand or such material as would prevent the water from percolating through. Now, is that a dam that has strength enough to resist such a torrential stream as the Chagres River?

Colonel ERNST. If you gave it mass enough I do not know why it should not. The Chagres River ceases to be a stream under those circumstances. The Chagres River then has vented its velocity, its impulsive force, some miles above. When it comes down to that dam it is nothing but a quiet lake.

The CHAIRMAN. At the same time the head of water with a 46-foot rise in flood during the wet season would be something like, we will say, 80 or 90 feet head of water?

Colonel ERNST. Well, it is a purely statical head; there is no blow or impulse; it is just a pressure.

The CHAIRMAN. That would be a tremendous pressure to put beneath a clay dam, with material that is pervious to water.

Colonel ERNST. Oh, yes.

The CHAIRMAN. It would be a very dangerous one, too.

Colonel ERNST. Yes; unless you make that foundation tight, it is a dangerous one.

The CHAIRMAN. Now, these floods up to 30 feet that you have been reading about from the report of the Commission occur, as I suppose, during every rainy season?

Colonel ERNST. No, sir; they have occurred only four times since the Panama Railroad was built.

The CHAIRMAN. Floods of thirty feet?

Colonel ERNST. Yes.

Senator HANNA. That is, four times in fifty years?

Colonel ERNST. Fifty years.

The CHAIRMAN. What would be the ordinary flood stage of water there in the ordinary rainy season at the Bohio dam, how much above the normal level of the river?

Colonel ERNST. The lip of the spillway is at 85 feet. Now, it will be an exceedingly rare thing for there ever to be 5 feet of water running over that spillway, so that the height of 90 feet would be a very rare thing.

The CHAIRMAN. Then, in the ordinary flood you state they would rise to a height of 5 feet above the normal conditions, provided by the Bohio dam and spillway, 5 feet above.

Colonel ERNST. Well, it might rise to that height; we allow an oscillation below that lip, too.

The CHAIRMAN. In the flood stage, and when there is no dam there or any spillway, or anything of that sort, these flood tides in the Chagres River would have a very considerable velocity?

Colonel ERNST. Oh, yes.

The CHAIRMAN. About how many miles an hour, if you could tell?

Colonel ERNST. I could not put that in numbers.

The CHAIRMAN. It would be quite a rapid stream?

Colonel ERNST. Oh, yes; a very swift current, a torrent.

Senator HANNA. After the dam was built, the slack water would extend how far from the breast of the dam?

Colonel ERNST. Thirteen miles.

Senator HANNA. So that this torrent would not affect the water in the dam?

Colonel ERNST. No, sir; it vents itself 13 miles up.

The CHAIRMAN. I was coming to the point where you are going to build the dam, and I want to know what preparations you are going to make to fence up the waters of the Chagres when you commence building the dam?

Colonel ERNST. A large portion of the dam would be built without disturbing the Chagres at all, and then the water would be diverted through the excavation for the Gigante spillway, and later on through the finished Bohio locks.

The CHAIRMAN. How would you turn the water through the Gigante spillway?

Colonel ERNST. By a temporary dam.

The CHAIRMAN. That is what I want to get at—where you would put the temporary dam.

Colonel ERNST. There is a very good place near Buena Vista, several miles above.

The CHAIRMAN. Then you would channel it to the spillway and carry it through there?

Colonel ERNST. Yes; the water would be passed through the excavation for the spillway before the spillway dam itself was built.

The CHAIRMAN. You tunnel it out through that and carry it through that excavation in the swamp Pena Blanca, just below that?

Colonel ERNST. Yes.

The CHAIRMAN. What would be the expense of that dam?

Colonel ERNST. We estimated it at \$500,000.

The CHAIRMAN. Do you think that is enough?

Colonel ERNST. I think so.

The CHAIRMAN. What would that be constructed of?

Colonel ERNST. Of piles, sand, clay, and rock; a temporary dam. It need not be perfectly tight.

The CHAIRMAN. We call it a temporary dam, and it is liable to be washed away by a big flood, is it not?

Colonel ERNST. Oh, yes; you are liable to accidents.

The CHAIRMAN. There is a good deal of risk about its being washed away by a big flood while you are building it, is there not?

Colonel ERNST. Well, there is some risk.

The CHAIRMAN. It is not an easy thing to contrive?

Colonel ERNST. No, sir.

The CHAIRMAN. It is a costly work and very difficult, that temporary dam?

Colonel ERNST. I should not say a very difficult one; it has difficulties.

The CHAIRMAN. I mean difficulties more in the contrivance of ways and means to keep it from being swept off?

Colonel ERNST. It would be subject to accidents sometimes.

The CHAIRMAN. If a flood of 30 feet should come while you are building that temporary dam, it would be apt to dissipate it?

Colonel ERNST. Very apt to injure it; yes, sir.

The CHAIRMAN. There is a great deal of risk in that, is there not?

Colonel ERNST. I do not think more than in other features of the work.

The CHAIRMAN. I suppose not. I do not think there is myself, but there is a good deal of difficulty in that.

Colonel ERNST. Oh, there is no doubt a risk.

The CHAIRMAN. So that there are contingencies to be looked forward to of serious character, both in the temporary dam and in the permanent dam?

Colonel ERNST. I should think so.

The CHAIRMAN. Do you agree with Mr. Morison that 125 feet below sea level at Bohio is an unusual and extraordinary depth in which to do pneumatic work?

Colonel ERNST. Well, it never has been done yet to that depth.

The CHAIRMAN. Do you know that it ever has been attempted but failed?

Colonel ERNST. No, sir.

The CHAIRMAN. Well, engineers have not as yet been heroic enough to undertake it.

Colonel ERNST. I do not know whether it requires heroism or not. They have not done it.

The CHAIRMAN. If you were at work for private owners who had to furnish the money out of their own pockets, you would despair of convincing them that it was a good venture.

Colonel ERNST. It would depend on the necessity for it. Of course you take chances where you have to do it, and you do not take them where you do not have to.

The CHAIRMAN. How far out from Colon, from the margin of the water, from the mouth of the canal, I would say, at Colon on a straight line, is this breakwater that is proposed to be put on the outside of the bay?

Colonel ERNST. We do not intend to build any?

The CHAIRMAN. Where is that breakwater located?

Colonel ERNST. The breakwater that is to be there is there now. It was built by the French; it was what they call a jetty; they built it out on what they called Christophe Colon and it is additional. It is an addition they made to the town.

The CHAIRMAN. That is the place on which De Lesseps's palace rests?

Colonel ERNST. Yes. Now, to get around that point we make this curve at the entrance. That point is already built. We do not intend to build any more breakwaters.

The CHAIRMAN. No jetty outside that?

Colonel ERNST. No. We are just going to dredge a channel 500 feet wide from that out into deep water.

The CHAIRMAN. Out into the sea?

Colonel ERNST. Yes, sir.

The CHAIRMAN. I have looked at the map—and, unfortunately, we have not got them here—but the Bay of Colon seems to be a curvature shaped a good deal like the mouth of a funnel, with the points of land that define the bay several miles apart. About how far are those points of land apart? About how wide is the opening of the bay?

Colonel ERNST. I should say 7 or 8 miles across, if I remember rightly.

The CHAIRMAN. And then, inside of that line, inside of the line drawn

across from those points, one to the other, there are several islands, if I understand it, on one of which is the town of Colon.

Colonel ERNST. Yes. Colon is on an island.

The CHAIRMAN. And it is connected with the main line by a trestle-work?

Colonel ERNST. Yes; and I think there is a solid dike there. I think it has ceased to be an island; I think they have connected it with the main shore.

The CHAIRMAN. It is situated to the mainland somewhat like Galveston, Tex., is, except that the opening is not so wide.

Colonel ERNST. Something like that.

The CHAIRMAN. And the bay in which ships would find anchorage and from which they would enter the canal is between the island and the coast.

Colonel ERNST. That is the natural bay; yes, sir.

The CHAIRMAN. That bay of Colon opens toward the north?

Colonel ERNST. Yes.

The CHAIRMAN. And receives whatever tidal waves or whatever storm waves or whatever winds come from the northward?

Colonel ERNST. Yes.

The CHAIRMAN. Well, is not that bay very often visited by heavy northers and winds?

Colonel ERNST. Ships have to go to sea there about two or three days in a year; two or three times a year a norther comes along and drives them out of there.

The CHAIRMAN. Everything has to leave there when a norther comes?

Colonel ERNST. Yes.

The CHAIRMAN. Steamships and all. That is to say that bay does not provide a shelter for vessels at anchorage while a norther is prevailing?

Colonel ERNST. Oh, no, sir. You are speaking now about the natural bay.

The CHAIRMAN. Yes.

Senator HANNA. But when the harbor is completed——

Colonel ERNST. Oh, they will just come in then.

The CHAIRMAN. I want to know what provision is made in your engineering to protect shipping there against the disaster of these northers that rush in in the way that you speak of?

Colonel ERNST. We make this curved channel around that point of which we have just been speaking—the French call it jetty—and we turn to the right, and in there is a harbor 3,500 feet long, and parts of it 800 feet wide.

The CHAIRMAN. Is it in there that vessels will ride at anchorage before they enter the canal?

Colonel ERNST. Yes; or tie up to the piers.

The CHAIRMAN. That is, the mooring ground or the anchorage ground—one thing or the other—of vessels that come in from the sea or go out to sea before they enter or after they leave the canal.

Colonel ERNST. Yes.

The CHAIRMAN. About how many acres would that harbor cover, that part of it, or about how many feet, if that is more convenient to tell?

Colonel ERNST. It is 3,500 feet by 500 feet; a little less than 50 acres.

The CHAIRMAN. That is the ground of the sea through which you say vessels would have an opportunity to make a turn around this comparatively sharp point?

Colonel ERNST. That is not included in the fifty acres. There will be fifty acres of harbor room after you get inside—after you get inside around this point.

The CHAIRMAN. A natural harbor?

Colonel ERNST. No, sir; this is an artificial harbor.

The CHAIRMAN. You have got to dredge out fifty acres of harbor there?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Now, in regard to the curvature, a good deal has been said about the curvature in both of these canals. I have always supposed that the Isthmian Canal Commission in providing for the largest ships that are afloat, and even for larger ships than are afloat, had made their curvature on both lines easy enough to permit safe, convenient, and comparatively rapid navigation through either line.

Colonel ERNST. We did that so far as we were able to do it. Of course you understand that the degree of curvature must be a compromise between the cost and the result.

The CHAIRMAN. Now, on the Nicaragua line did you find any difficulty in the conditions that prevailed at these curves, in giving, say, room enough, I will call it, in widening the curves so as to admit larger ships? Did you find difficulty there?

Colonel ERNST. Did we find any difficulty?

The CHAIRMAN. Yes.

Colonel ERNST. Only in increasing the cost, that is all.

The CHAIRMAN. There is no physical difficulty?

Colonel ERNST. None at all.

The CHAIRMAN. So if it should become necessary to enlarge the area through which the vessel would pass, it could be done in Nicaragua as it has been done in Suez and other places?

Colonel ERNST. Yes.

The CHAIRMAN. That would only be an addition to the cost of it, but there is no physical impediment?

Colonel ERNST. No, sir.

The CHAIRMAN. Good curves can be got there for ships of any size?

Colonel ERNST. Yes.

The CHAIRMAN. Now, about the navigation of those canals at night. Do you apprehend that they can not be so lighted as that vessels, even the largest of them, can not go safely through at night?

Colonel ERNST. No; I think it can not be done at night.

Senator KITTREDGE. What about the dangers or difficulties at night?

Colonel ERNST. I think the insurance might be increased by night navigation.

The CHAIRMAN. But as to that you could not get any data that was satisfactory?

Colonel ERNST. We could not get anything that we would like to present to you at all.

The CHAIRMAN. You then say that on either route it would be practicable for ships of the largest size, sailing under their own steam?

Colonel ERNST. I do.

The CHAIRMAN. Tugs might be necessary, but they are necessary in all these large canals, are they not—these canals for large ships?

Colonel ERNST. They are on the Manchester and on the Suez canals.

The CHAIRMAN. On the Manchester canal the curves are very short.

Colonel ERNST. Some of them are very short.

The CHAIRMAN. Had to be so, I suppose, because of the expensiveness of the country through which they were constructed.

Colonel ERNST. Yes.

The CHAIRMAN. How about the Kiel Canal?

Colonel ERNST. I do not think tugs are a necessity at all there; vessels can go through under their own steam.

The CHAIRMAN. That is a sea-level canal, is it not, practically?

Colonel ERNST. Yes; they have guards locks.

The CHAIRMAN. The canal leading into St. Petersburg—I forget the name of that——

Colonel ERNST. I am not very familiar with that canal.

The CHAIRMAN. You don't know about that?

Colonel ERNST. No, sir.

The CHAIRMAN. Have you ever visited that canal in the north of Scotland, the Caledonia canal?

Colonel ERNST. No, sir.

The CHAIRMAN. Well, that is a very important work, is it not?

Colonel ERNST. Oh, yes; in its day it has been a very important one.

The CHAIRMAN. And it saves a vast amount of difficulty in passing around by the Hebrides to the north of England.

Colonel ERNST. Yes.

The CHAIRMAN. Yet that is a shallow channel and one of small dimensions.

Colonel ERNST. Yes.

The CHAIRMAN. And a very long one, too—over a hundred miles long.

Colonel ERNST. Yes.

The CHAIRMAN. With canalization nearly the whole way.

Colonel ERNST. Yes, sir.

The CHAIRMAN. With a summit level of about a hundred feet.

Colonel ERNST. Yes.

The CHAIRMAN. A very important commercial work for the benefit of the people of England, and of the world, for that matter.

Colonel ERNST. It has been undoubtedly a very important work.

Senator HANNA. Could ships of the present day navigate it?

Colonel ERNST. No, sir.

The CHAIRMAN. Well, ships do navigate it right along.

Senator HANNA. I mean the large ships.

The CHAIRMAN. You have spoken of what we call the coastwise line, taking one end of it to be at New York and the other at San Francisco, and you have mentioned the distance on the eastern side of the Isthmus at, I believe, 200 miles in favor of Nicaragua.

Colonel ERNST. No, sir; not the eastern side. The eastern side is a little the other way, curiously enough.

The CHAIRMAN. From New York?

Colonel ERNST. From New York.

The CHAIRMAN. How is it from New Orleans?

Colonel ERNST. Then it is the other way; then Greytown is nearer to New Orleans than Colon.

The CHAIRMAN. I will take it from our actual coast line. I will take it from Santiago on the one side and Corpus Christi on the other. It

would be longer from Corpus Christi down to the Isthmus, the canal at Panama, than at Nicaragua?

Colonel ERNST. Yes.

The CHAIRMAN. About how much?

Colonel ERNST. I should say about 50 miles, as I remember it. I do not like to give you these figures this way without comparing them.

The CHAIRMAN. You can correct them when you look your deposition over. On the other side, I think Mr. Morison stated that it was 543 miles between Panama. Does that correspond about with your recollection?

Colonel ERNST. I could not say it was quite as much as that. As I carry it in my mind, it is about 400 miles.

The CHAIRMAN. Whatever it is, it is that much elongation of what we call the line of coastwise traffic of the United States. I would put the point between San Diego, Cal., and Corpus Christi, and others usually put them between San Francisco and New York or New Orleans. Well, you think the time taken up in crossing by the Nicaragua Canal would be compensated by the shorter time taken up in crossing by the Panama Canal as to at least a part of that coastwise line?

Colonel ERNST. There will be some compensation; yes, sir.

The CHAIRMAN. But still the line through the Panama would be longer for all places in the Gulf and something shorter, you say, from New York. That is because in reaching Panama from New York you would go through the Windward Passage on a line that is almost directly south, and in the other case you would have to make some little detour to get between Yucatan and the westernmost point of Cuba.

Now, in your calculations of the commercial advantages of these two canals to the people of the United States did you make any computation of the advantage to sailing ships?

Colonel ERNST. We considered it, but we did not reduce it to figures. We rather ignored sailing ships.

The CHAIRMAN. You threw out the calculation entirely?

Colonel ERNST. Yes.

The CHAIRMAN. Well, that was upon the hypothesis that sailing ships are going out of vogue and the steam ships are coming in?

Colonel ERNST. Very largely, and that they would not use the canal anyhow.

The CHAIRMAN. The sailing ships would not use the canal?

Colonel ERNST. No.

The CHAIRMAN. They would have to employ tugs in order to get through, at least a part of the distance. I refer to the Nicaragua Canal. On the lake navigation on that canal they would not have necessity for a tug.

Colonel ERNST. Well, the distance is pretty short there, you know; there are about 28 miles of dredged channel in that lake.

Senator HANNA. And they would have to beat against a head wind?

Colonel ERNST. I think they would probably take a tug right through.

The CHAIRMAN. Yes; very probably they would. Well, your idea is, then, that we are building this canal, if at all, for the benefit of steam navigation?

Colonel ERNST. Mainly; yes, sir.

The CHAIRMAN. That was the basis upon which you made all of your computations of commercial advantage?

Colonel ERNST. Yes.

Senator HANNA. With reference to the commerce between the two coasts, the Atlantic and the Pacific, as to the condition commercially, what, in your judgment, would be the greatest, the commerce from the north Atlantic ports or from the Gulf of Mexico. Where is the preponderance of commerce?

Colonel ERNST. As it stands to-day the preponderance is on the Atlantic, but I am not sure that that is going to be so ten years after that canal is finished.

The CHAIRMAN. Is the Mississippi River and its tributaries included in your question?

Senator HANNA. I just had reference to the commerce to-day from New York, Philadelphia, Boston, Newport, etc.

Colonel ERNST. You meant the shipping of the harbors?

Senator HANNA. Yes.

The CHAIRMAN. I have an idea that the Mississippi River and its tributaries are going to derive more advantage from either canal than any other part of the United States.

Senator HANNA. I hope so. The inquiries as made in this examination, raising doubts and difficulties with respect to the different routes, were all taken into consideration in making your decision as to the best route.

Colonel ERNST. Yes.

The CHAIRMAN. I wish you would take with you this afternoon when you go to your quarters your statement made before this committee at a previous time, and I shall want to ask you after you have looked it over whether you have any change to make in any statement of fact that you then furnished to the committee. I merely want to call your attention to that, and I will ask you that question when you return this afternoon.

Senator HANNA. Was Professor Haupt a member of your Commission?

Colonel ERNST. Yes.

Senator HANNA. Was he on the Isthmus with the Commission?

Colonel ERNST. No, sir.

Senator HANNA. With reference to the Bohio dam, there is a difference of opinion with reference to the kind of dam that should be constructed there among the members of the Commission.

Colonel ERNST. Yes, sir.

Senator HANNA. Mr. Morrison is looked upon as a very competent engineer in that sort of work, is he not?

Colonel ERNST. Yes, sir.

Senator HANNA. Would you consider his opinion as high an authority as could be had in this country in the construction of dams and deep foundations?

Colonel ERNST. As high as that of any individual. Yes; but I do not think it is as high as that of the Commission.

Senator HANNA. That is, you think the combined talent of the Commission would be stronger than the opinion of one man?

Colonel ERNST. Yes.

Senator HANNA. Well, there is no doubt in the minds of the Commission in reaching their conclusions that the construction of the Bohio dam as a masonry dam is entirely feasible?

Colonel ERNST. Entirely so.

Senator HANNA. Do you consider the price asked by the Panama Canal Company, \$40,000,000, for their property a reasonable price?

Colonel ERNST. I do.

Senator HANNA. As a low price for what you get for it?

Colonel ERNST. Yes; I should say a low price.

Senator KITTREDGE. How many trips have you made to the Isthmus since your connection with the Commission?

Colonel ERNST. Only one.

Senator KITTREDGE. And about when was that?

Colonel ERNST. We went down in January, 1900, and we were there about three months.

Senator KITTREDGE. How much time did you spend on the Nicaragua route?

Colonel ERNST. About six weeks.

Senator KITTREDGE. And the balance of the time on the Panama?

Colonel ERNST. Yes, and in traveling, getting there—about two weeks in Panama.

Senator KITTREDGE. Why did you make that trip—that visit?

Colonel ERNST. Well, we wanted to see the ground for ourselves and see on the ground what had been described to us on paper. There are some things that could not be described on paper; for instance, the material in the Culebra cut, and a great many things you can see on the ground which you can not see to such advantage in any other way.

Senator KITTREDGE. Do you regard the trip and the examination you made of each route as necessary in order to reach a correct conclusion and judgment?

Colonel ERNST. Oh, I think so.

The CHAIRMAN. Well, you judged, after all, in regard to the Bohio dam and in regard to the Culebra cut, by borings or by pits that had been sunk by other people, and that you did not witness yourself.

Colonel ERNST. Well, in the Culebra cut we were able to do that. Of course in a great majority of the instances all these physical data that we have for them we have to depend on other people, to depend on subordinates. They make the borings and submit samples and they report. It is the same way with reference to surveys and measurements. In the Culebra cut they had taken very great pains to find out what there was there, and they had sunk test pits or wells big enough for a person to go down in.

The CHAIRMAN. I suppose all the engineers of the Commission who undertook to form judgments upon situations there and what could be done had to rely upon the same material, the borings, the hydrographic measurements, and matters of that kind.

Colonel ERNST. Yes, sir.

The CHAIRMAN. They were brought here and examined here.

Colonel ERNST. Yes, sir.

The CHAIRMAN. You did not examine them at all on the Isthmus, did you—these borings?

Colonel ERNST. No, sir; as a rule we did not, except some that happened to be going on while we were there. Of course we did take an interest in everything that was going on while we were there, but the great mass of the physical information was brought to us by other people.

The CHAIRMAN. And that is what you base your judgment upon as to the condition of things beneath the surface.

Colonel ERNST. Yes, sir.

The CHAIRMAN. Entirely upon those borings?

Colonel ERNST. Yes, sir.

The CHAIRMAN. That was equally open to all the members of the Commission, was it not?

Colonel ERNST. Yes. There are a great many points, Senator, you can pick up by a personal visit that you can never do in any other way, or if you did not make one. For instance, no man who has ever come down the Chagres River in a boat, and ridden along its banks on a horse, will call it a silt-bearing river.

The CHAIRMAN. Let me ask you, were you ever up at the top of the Culebra cut?

Colonel ERNST. Yes, sir.

The CHAIRMAN. I mean on the heights?

Colonel ERNST. Yes; I climbed clear up to the top.

The CHAIRMAN. And examined the stratification there?

Colonel ERNST. Yes.

The CHAIRMAN. Does not that resemble pretty closely the stratification at the point you mention of difficulty on the Nicaragua route?

Colonel ERNST. No, sir; that is different from anything I ever heard of before, and I could hardly believe it to exist. That layer of clay 10 feet thick down below 65 feet of rock is a most extraordinary formation.

The CHAIRMAN. Did you not find formations of that kind, but not in such great depths, at Culebra, toward the top of the hill?

Colonel ERNST. No; never heard of that anywhere else. There is another place on the Nicaragua line where it lies below the bottom of the canal prism, and for that reason it is not so important.

The CHAIRMAN. Avalanches or slides have occurred on the Culebra cut?

Colonel ERNST. There were some bad slides up there in the top in the early history of that cut.

The CHAIRMAN. Well, in modern history also.

Senator HANNA. Have there been any slides of that nature that occurred in the early work there since the new company have been working?

Colonel ERNST. No, sir.

The CHAIRMAN. Toward the crest of the Culebra ridge, did you find beds of indurated material, of hard clay or rock, upon which rested beds of earth that were permeable by water, that would slip off?

Colonel ERNST. Yes, sir.

The CHAIRMAN. You found those?

Colonel ERNST. Yes, sir.

The CHAIRMAN. Would you not expect that to occur hereafter as well as heretofore?

Colonel ERNST. Well, if it is not drained I would; but I expect that to be corrected by draining.

The CHAIRMAN. Therefore you put drainage in and made benches so that you could make the drainage?

Colonel ERNST. Yes, sir.

Senator KITTREDGE. In the construction of the Bohio dam, suppose the danger from seepage could be removed, would you think that Mr. Morison's plan of dam would be ample for the purpose?

Colonel ERNST. Oh, yes; I think it would.

The CHAIRMAN. Then have you knowledge regarding the way in which seepage of that character is eliminated?

Colonel ERNST. I know of no way except to introduce an impervious barrier, and that is what our masonry core is intended to be.

Senator KITTREDGE. The plan of the dam at Bohio suggested by the Commission eliminates, as I understand, all possibility of danger from seepage?

Colonel ERNST. Yes.

Senator KITTREDGE. And that, as I understand it, is the purpose of going down to the rock?

Colonel ERNST. That is it entirely.

Senator KITTREDGE. Do I understand that the construction of that dam involves engineering difficulties impossible to accomplish?

Colonel ERNST. I think not.

Senator KITTREDGE. You mention in your testimony something about getting over the difference between 110 and 115 feet, if that is the distance, to which such work has gone, and the 128 feet made necessary for the dam at Bohio, if it was constructed upon the plan recommended by the Commission. Will you not explain somewhat in detail how that difference is to be arranged?

Colonel ERNST. There are various methods that have been suggested. One is to pump down the head, inclose the area on which this dam is constructed, and keep down the head of water.

Senator KITTREDGE. That would reduce the apparent height.

Colonel ERNST. Reduce the apparent height at the surface. The depth to which you can go is dependent on the amount of pressure a man can endure. The limit so far in actual execution has been about 110 or 112 feet. Now, one method is to pump down the head and another one is to dredge through wells, as they do in India, dredge after you get down to this 110 feet, dredge through that and sink concrete down through this; and another one still would be to inject into this sand grout, which is fluid cement.

Senator KITTREDGE. Did you examine the conditions existing at the location of the Bohio dam to determine whether the result could be accomplished in the ways that you have suggested?

Colonel ERNST. No, sir; this is away down underground. These borings were all studied here in Washington. Of course, I saw the surface of the ground there and we have all the topography of it; we have the thing really here in the city, the full description of it.

Senator KITTREDGE. I refer to the conditions about lowering of the apparent surface.

Colonel ERNST. Oh, yes; the place seems to be favorable for that.

Senator KITTREDGE. So that in the operation preliminary to the construction of this dam, under the plan suggested by the Commission, the apparent height of the surface could be reduced?

Colonel ERNST. Yes, sir.

Senator KITTREDGE. To correspond to the difference between 128 feet and 110 feet, at which depth work has already been constructed?

Colonel ERNST. Exactly.

Senator KITTREDGE. Now, one other question in regard to the sanitary features. You speak of this Government having learned lessons in regard to sanitary management. What have you in mind?

Colonel ERNST. Well, at that moment I was thinking particularly of the experience of the Panama Company, the railroad company, and the canal company at that particular site, the experience they have had, and the necessity they have demonstrated of taking extraordinary precautions. That is what I was referring to.

Senator KITTREDGE. Do you think that if those precautions were taken it would improve the sanitary conditions, the healthful conditions of that route?

Colonel ERNST. I have no doubt that it would.

Senator KITTREDGE. Are you able to state to what extent as compared with the healthful or unhealthful conditions at Nicaragua?

Colonel ERNST. No. I think that the Nicaragua route has this advantage, that the soil has never been poisoned; I mean by man. It is a wilderness mostly, and the foul contributions of man are not there. Nature, I believe, to be just as vicious there as she is in Panama; the swamps and the humidity and the oppressive heat are all there, and if it had been occupied by a filthy race for the same length of time I believe the same conditions would prevail. Now, we can take that ground fresh and, with the knowledge that men have of what is necessary from a sanitary point of view, I think perhaps we might escape what they had at Panama, but we can not do it without those precautions. I believe it is necessary to take all the precautions at Nicaragua that it is at Panama. I believe that you could undoubtedly improve the conditions at Panama, but how perfect you can make them I can not say.

Senator KITTREDGE. Had you any personal experience regarding the conditions at Santiago or at Habana?

Colonel ERNST. No; I was in Porto Rico. I was in Habana afterwards.

Senator KITTREDGE. Do I understand that you took into consideration the comparative healthfulness and the sanitary conditions of each route in reaching your conclusions?

Colonel ERNST. Yes.

Senator KITTREDGE. That was carefully considered by you and by the other members of the Commission?

Colonel ERNST. Yes.

The committee then (at 12.30 o'clock p. m.) took a recess until 3 o'clock p. m.

WASHINGTON, D. C., *Tuesday, February 18, 1902.*

The subcommittee met at 3 o'clock p. m.

Present: Senator Morgan (chairman).

Also Senator Kittredge, a member of the committee.

ADDITIONAL STATEMENT OF COL. OSWALD H. ERNST.

The CHAIRMAN. Did you get the paper I referred to?

Colonel ERNST. Yes; here it is.

The CHAIRMAN. I would like very much to have this go into the record. It may become very important if the canal should be built.

Colonel ERNST. It is very carefully gotten up. The reason we did not publish it is because there are undoubtedly errors in it. Estimates are too high in some respects and too low in others. We thought they would correct each other. The comparison, however, is

a fair one. It is the same for both canals. It is a study to which we devoted a good many weeks. It is as follows:

TENTATIVE ORGANIZATION FOR THE MAINTENANCE AND OPERATION OF THE CANALS.

I. NICARAGUA CANAL.

Supreme control to rest in a board of five members, located in Washington. The duties of the board will be:

1. To make regulations for the government of the canal, including the tariff of charges, navigation rules, police and sanitary rules, and, in short, all rules required for the operation and maintenance of the canal.

2. To make or approve all appointments the salary of which equals or exceeds \$100 per month.

3. To make or approve all contracts.

4. To audit all money accounts before transmitting them to the Treasury Department.

The annual expenses of the board may be placed at \$100,000.

Organization on the isthmus.—The general control to be vested in a governor having his headquarters at Greytown, where the general offices will be located.

The administration will be divided among six departments, viz:

A. Engineer department, charged with all the maintenance and improvement of the canal, including the repair shops and storehouses and the repairs of public buildings; also with the location and sale or rental of lands.

B. Transit department, charged with the navigation of the canal, the assessment of dues, the service of the ports, including light-houses, and the operation of telegraph and telephone lines.

C. Medical department, charged with the hospital and other medical service, including port, quarantine, and sanitary inspection service.

D. Finance department, charged with the collection of dues, payment of salaries, and management of the funds.

E. Law department, charged with the supervision of such minor courts as may be established and with all legal matters.

F. Police department, charged with the preservation of order and with the management of the armed force required for that purpose.

The governor.—The governor will issue orders to the heads of departments, will make reports to the board of control, and conduct all correspondence with that board, and will make frequent inspection of all parts of the canal. Attached to his office will be a secretary, two clerks, two messengers, and one small inspection steamer, the latter to be available for other officials when not required by the governor.

Annual expense of governor's office.

Salaries:

Governor	\$15,000
Secretary	5,000
Clerks, 2 at \$1,500.....	3,000
Messengers, 2 at \$400	800
Inspection steamer	15,000
Office supplies	500
Total	39,300

A. *Engineer department.*—At the head of this department will be a chief engineer at \$7,500. In his immediate office will be one draftsman, at \$1,500; one chief clerk, at \$2,000; one clerk, at \$1,500; one stenographer, at \$1,500, and one messenger, at \$400. The chief engineer will have an inspection steamer at \$15,000.

There will be a general shop at Greytown, under the charge of a master mechanic, at \$3,000, who will employ two foremen mechanics, at \$2,000; ten mechanics, at \$1,500; ten helpers, at \$360; one master laborer, at \$900; five laborers, at \$360, and one clerk, at \$1,200. The master mechanic will also have general charge of the branch shops, to be located at Boca San Carlos, Fort San Carlos, and Brito. In each of these shops there will be employed one foreman mechanic, at \$2,000; three mechanics, at \$1,500; three helpers, at \$360; one master laborer, at \$900; four laborers, at \$360, and one clerk, at \$1,200. The shops should be partially self-supporting. If charged entirely against the canal this salary list should be sufficient to cover such materials as the canal may use in the shops.

There will be a general storehouse at Greytown and a branch storehouse at each of the other points where shops are to be located. The general storehouse will be under charge of a general storekeeper, at \$2,400, who will employ four clerks, at \$1,500, and ten laborers, at \$360. At each branch storehouse there will be a storekeeper, at \$2,000, one clerk, at \$1,500, and four laborers, at \$360.

For purposes of maintenance the canal will be divided into three divisions, the Atlantic division, extending from the Caribbean to and including the dam; the middle division, extending from the dam to deep water in Lake Nicaragua, and the Pacific division, extending from Lake Nicaragua to the Pacific. Each division will be under the immediate charge of an assistant engineer, at \$3,000, with 1 draftsman, at \$1,500, and one stenographer, at \$1,500. The headquarters of the respective divisions will be at Boca San Carlos, Fort San Carlos, and Brito.

In the Atlantic division there will be maintained one seagoing dredge, which will be mainly employed at Greytown Harbor, at an annual cost of \$65,000; one ordinary dredge, at \$65,000; one pile driver, at \$5,000; two steam tugs, at \$14,000; six dump scows, at \$1,000, and six flat scows, at \$300 each, these figures including pay roll and maintenance of plant. The plant will be under charge of an overseer, at \$2,400; three master laborers, at \$900, and, say, sixty laborers, at \$360 each.

The Middle and Pacific divisions will each have the same plant and force, except the seagoing dredge, and 1 less master laborer and twenty less laborers. The seagoing dredge provided for Greytown will also perform the necessary dredging at Brito.

It is not expected that this force will provide for the depreciation of the metal and masonry structures. For the metal structures, which include lock gates, sluices, and operating machinery, the annual depreciation is estimated to be $7\frac{1}{2}$ per cent of the cost; for the masonry structures one-half of 1 per cent of the cost.

The land office will have one clerk, at \$1,800.

*Annual expense of the engineer department.***Salaries:**

Chief engineer	\$7,500
Assistant engineers, 3, at \$3,000.....	9,000
Draftsmen, 4, at \$1,500.....	6,000
Master mechanic.....	3,000
Foremen mechanics, 5, at \$2,000.....	10,000
Mechanics, 19, at \$1,500.....	28,500
Helpers, 19, at \$360.....	6,840
Master laborers, 11, at \$900.....	9,900
Laborers, 179, at \$360.....	64,440
General storekeeper.....	2,400
Storekeepers, 3, at \$2,000.....	6,000
Overseers, 3, at \$2,400.....	7,200
Clerks—	
One at \$2,000.....	2,000
One at \$1,800.....	1,800
Eight at \$1,500.....	12,000
Four at \$1,200.....	4,800
Stenographers, 4, at \$1,500.....	6,000
Messenger, 1, at \$400.....	400

Plant:

Inspection steamer.....	15,000
Dredges, 4, at \$6,500.....	260,000
Pile drivers, 3, at \$5,000.....	15,000
Tugs, 6, at \$14,000.....	84,000
Scows—	
Eighteen at \$1,000.....	18,000
Eighteen at \$300.....	5,400

Supplies.....	100,000
Depreciation of metal structures (7½ per cent on \$6,062,000).....	454,650
Depreciation of masonry (one-half of 1 per cent on \$33,176,400).....	165,882

Total..... 1,305,712

B. Transit department.—At the head of this department will be a general superintendent, at \$7,500. In his immediate office there will be one chief clerk, at \$2,000; two clerks, at \$1,500; two clerks, at \$1,200; one stenographer, at \$1,500; one chief telegrapher, at \$1,800, and one messenger, at \$400. There will be two assistant superintendents, at \$3,000, one for the division east of the lake, the other for the Pacific division. At each of the ports, Greytown and Brito, there will be a captain of the port, at \$2,400; a surveyor, at \$1,800, and thirty pilots, at \$2,000. At Brito there will be three light keepers, at \$900; at Greytown and each of the lake ports there will be two light keepers, at \$900. At each of the four ports there will be four sailors, at \$360, for tending buoys and range marks. The light keepers and sailors will report to the assistant superintendent of the section. Each captain of the port will have one steam pilot boat, at \$14,000; six steam tugs, at \$14,000, and two naphtha launches, at \$2,500.

It is expected that the railroad will be maintained from Greytown to the San Juan River dam and from the lake to Brito. The total mileage, including sidings, tracks to quarries, etc., will be about 80 miles. An allowance of \$1,000 per mile, or \$80,000, is made for maintenance. It is expected that receipts will cover transportation expenses. The superintendent of the railroad will report to the general superintendent.

Under the chief telegrapher will be, say, twelve linemen at \$720. and the following force of telegraphers: Four at Greytown, two at each lock, two at the dam, and four at Brito, making twenty-eight in all, at \$900.

Each assistant superintendent will have one stenographer at \$1,500, one clerk at \$1,500, one messenger at \$400, and one naphtha launch at \$2,500.

At each lock there will be one lock master at \$1,800, and one assistant lock master at \$1,200, one machinist at \$1,500, two assistant machinists at \$1,200, three lock foremen at \$480, six gatemen at \$360 each, twelve linemen at \$300 each, and three watchmen at \$300 each.

At the dam and its wasteway there will be one sluice master at \$1,200, six sluicemen at \$360, and one watchman at \$300.

Annual expense of the transit department.

Salaries:

General superintendent	\$7,500
Assistant superintendents, 2, at \$3,000	6,000
Captains of the port, 2, at \$2,400	4,800
Surveyors, 2, at \$1,800	3,600
Pilots, 60, at \$2,000	120,000
Chief clerk	2,000
Clerks—	
Four, at \$1,500	6,000
Two, at \$1,200	2,400
Stenographers, 3, at \$1,500	4,500
Chief telegrapher	1,800
Telegraphers, 28, at \$900	25,200
Line repairers, 12, at \$720	8,640
Light keepers, 9, at \$900	8,100
Sailors, 16, at \$360	5,760
Lock masters, 9, at \$1,800	16,200
Assistant lock masters, 9, at \$1,200	10,800
Machinists, 9, at \$1,500	13,500
Assistant machinists, 18, at \$1,200	21,600
Lock foremen, 27, at \$480	12,960
Gatemen, 54, at \$360	19,440
Linemen, 108, at \$300	32,400
Sluice master	1,200
Sluicemen, 6, at \$360	2,160
Messengers, 28, at \$400	1,200
Watchmen, 28, at \$300	8,400

Plant:

Steam pilot boats, 2, at \$14,000	28,000
Steam tugs, 12, at \$14,000	168,000
Naphtha launches, 6, at \$2,500	15,000
General supplies for locks	16,000
Lights for locks	13,500
Maintenance of railroad	80,000

Total 666,660

C. Medical department.—At the head of this department will be a chief surgeon at \$6,000. In his immediate office there will be one medical inspector at \$3,000, one clerk at \$1,800, one clerk at \$1,500, and one messenger at \$400. There will be quarantine stations at Greytown and Brito, at each of which will be one quarantine officer at \$2,400, and one naphtha launch at \$2,500. A general hospital will be established at some point near the lake with a staff consisting of one surgeon at \$3,600, four assistant surgeons at \$2,000, two stewards at \$900, twenty nurses at \$500, four cooks at \$500, and ten laborers at \$360.

There will be four emergency hospitals located, respectively, at Greytown, Boca San Carlos, Fort San Carlos, and Brito. Each will be in charge of one assistant surgeon at \$2,000, and will have one steward at \$900, four nurses at \$500 each, one cook at \$500, and two laborers at \$360.

Annual expense of the medical department.

Salaries:

Chief surgeon	\$6,000
Medical inspector	3,000
Quarantine officers, 2, at \$2,400	4,800
Surgeon	3,600
Assistant surgeons, 8, at \$2,000	16,000
Stewards, 6, at \$900	5,400
Nurses, 36, at \$500	18,000
Clerks—	
One at \$1,800	1,800
One at \$1,500	1,500
Messenger, 1, at \$400	400
Cooks, 8, at \$500	4,000
Laborers, 18, at \$3,600	6,480
Naphtha launches, 2, at \$2,500	5,000
Supplies	50,000
Total	125,980

D. *Finance department.*—At the head of this department will be a treasurer, at \$6,000. In his immediate office will be 1 teller, at \$2,400; 1 paymaster, at \$2,400; 1 chief clerk, at \$2,000; 2 clerks, at \$1,500; 2 clerks, at \$1,200, and 1 messenger, at \$400. There will be at each of the ports—Greytown and Brito—1 collector, at \$2,400; 1 clerk, at \$1,500, and 1 messenger, at \$400.

Annual expense of the finance department.

Salaries:

Treasurer	\$6,000
Collectors, 2, at \$2,400	4,800
Teller	2,400
Paymaster	2,400
Chief clerk	2,000
Clerks—	
Four at \$1,500	6,000
Two at \$1,200	2,400
Messengers, 3, at \$400	1,200
Office supplies	500
Total	27,700

E. *Law department.*—At the head of this department will be a solicitor, at \$6,000; in his immediate office there will be a chief clerk, at \$2,000; two clerks, at \$1,500 each and one messenger, at \$400. There will be a justice of the peace at each of the four points—Greytown, Boca San Carlos, Fort San Carlos, and Brito—who may be canal officials, receiving \$500 extra pay for the performance of this duty. Each will have one clerk, at \$1,200.

Annual expense of the law department.

Salaries:

Solicitor	\$6,000
Chief clerk	2,000
Clerks:	
Two, at \$1,500	3,000
Four, at \$1,200	4,800
Messenger	400
Justices of the peace, four at \$500	2,000
Office supplies	500
Total	18,700

F. *Police department.*—At the head of this department will be a marshal at \$6,000. In his immediate office there will be one clerk, at \$1,500, and one messenger, at \$400.

There will be four posts—Greytown, Boca San Carlos, Fort San Carlos, and Brito. At each will be stationed one captain, at \$2,000; two lieutenants, at \$1,500; twelve sergeants, at \$1,200, and ninety privates, at \$1,080. Eight canoes, with four paddlers each, will be maintained at Greytown and the same at Boca San Carlos. Four canoes and ten saddle horses will be maintained at Fort San Carlos and twenty saddle horses will be maintained at Brito. The maintenance of a canoe and wages of crew will cost \$1,300 per year. One saddle horse will cost \$250 per year.

Annual cost of police department.

Salaries:	
Marshal	\$6,000
Clerk.....	1,500
Messenger	400
Captains, 4 at \$2,000.....	8,000
Lieutenants, 8 at \$1,500.....	12,000
Sergeants, 48 at \$1,200.....	57,600
Privates, 360 at \$1,080.....	388,800
Canoes and crews, 20 at \$1,300.....	26,000
Saddle horses, 30 at \$250.....	7,500
Office supplies	500
Total	508,300

General summary of annual expense of maintenance and operation.

Supreme control in United States.....	\$100,000
Governor's office.....	39,300
Engineer department.....	1,305,712
Transit department.....	666,660
Medical department.....	125,980
Finance department.....	27,700
Law department.....	18,700
Police department.....	508,300
Add 20 per cent.....	558,470
Total	3,350,822

Or, say, \$3,350,000.

II. PANAMA CANAL.

Supreme control to rest in a board of not less than five members, located at Washington. The duties of this board will be:

1. To make regulations for the government of the canal, including the tariff of charges, navigation rules, police and sanitary rules, and, in short, all rules required for the operation and maintenance of the canal.

2. To make or approve all appointments to office of which the salary equals or exceeds \$100 per month.

3. To make or approve all contracts.

4. To audit all money accounts before transmitting them to the Treasury Department.

The expenses of this board may be placed at \$100,000.

Organization at the isthmus.—The general control of all the affairs of the canal to be vested in a governor having his headquarters at Colon, where are to be located the general offices.

The administration to be divided among six departments, viz:

A. Engineer department, charged with all the works for the main-

tenance and improvement of the canal, and with the repair shops and storehouses; also the repair of the public buildings, and with the location and sale or rental of lands.

B. Transit department, charged with the navigation of the canal, the assessment of dues, the service of the ports, including light-houses, the operation of the Panama Railroad, and of telegraph and telephone lines.

C. Medical department, charged with the hospital and other medical service, including port quarantine, and the sanitary inspection service.

D. Finance department, charged with the collection of dues, payment of salaries, and management of the funds.

E. Law department, charged with the supervision of such minor courts as may be established, and with all legal matters.

F. Police department, charged with the preservation of order, and with the management of the armed force required for that purpose.

The governor.—To issue orders to the heads of departments and receive reports from them; to make reports to the home government and conduct all correspondence with that government; to make frequent inspections of all parts of the canal. His salary will be \$15,000. Attached to his office will be one secretary, at \$5,000; two clerks, at \$1,500 each; two messengers, at \$400 each, and one small inspection steamer, at \$15,000, the latter to be available for other officials when not required by the governor. Supplies for this office, \$500.

Recapitulation for governor's office.

Governor	\$15,000
Secretary	5,000
Two clerks, at \$1,500 each	3,000
Two messengers, at \$400 each	800
One inspection steamer	15,000
Office supplies	500
Total	39,300

A. *Engineer department.*—At the head of this department will be a chief engineer, at \$7,500. Attached to his office will be an assistant engineer, at \$3,000; two draftsmen, at \$1,500 each; one chief clerk, at \$2,000; one stenographer, at \$1,500; one clerk, at \$1,500, and one messenger, at \$400.

The general shops will be located at Colon. They will be under the charge of one master mechanic, at \$3,000; who will employ, say, two foremen mechanics, at \$2,000 each; ten mechanics, at \$1,500 each, with ten helpers, at \$360 each; one clerk, at \$1,200; one master laborer, at \$900, and five laborers, at \$360 each.

Subsidiary shops will be located at Matachin and at La Boca. Together they will employ two foremen mechanics, at \$2,000 each; six mechanics, at \$1,500 each, with six helpers, at \$360 each, and two clerks, at \$1,200 each; two master laborers, at \$900 each, and eight laborers, at \$360 each. The shops should be partially self-supporting. If charged entirely against the canal, this salary list should be sufficient to cover such materials as the canal may use in the shops.

The general storehouses will be located at Colon. They will be under the charge of one chief storekeeper, at \$2,400, who will employ four clerks, at \$1,500 each, and, say, ten laborers, at \$360 each. Subsidiary storehouses will be located at Matachin and at La Boca and

together will employ two storekeepers, at \$2,000 each; two clerks, at \$1,500 each, and eight laborers, at \$360 each.

For purposes of maintenance and repair the canal will be divided into two sections, the Atlantic and Pacific sections, the first extending from Colon to and including the Obispo gates, the second extending from the Obispo gates to Panama Bay. In each section will be maintained 1 dredge, at \$65,000; 1 pile driver, at \$5,000; 2 steam tugs, at \$14,000 each; 6 dump scows, at \$1,000 each, and 6 flat scows, at \$300 each. The principal employees in each besides the crews of the dredges, tugs, and pile driver will be 1 overseer, at \$2,400, and 2 master laborers, at \$900 each; and, say, 40 laborers, at \$360 each. The building supplies needed for this force, in addition to what they can obtain themselves, will consist mainly of lumber and cement, for which allow \$50,000.

The land office will be in charge of 1 land clerk, at \$1,800.

Recapitulation for engineer department.

Chief engineer.....	\$7,500
Assistant engineer.....	3,000
Two draftsmen, at \$1,500 each	3,000
One chief clerk.....	2,000
One stenographer	1,500
One clerk.....	1,500
One messenger	400
One master mechanic at Colon	3,000
Two foremen of mechanics, at \$2,000 each	4,000
Ten mechanics, at \$1,500 each	15,000
Ten helpers, at \$360 each	3,600
One clerk and timekeeper.....	1,200
One master laborer	900
Five laborers, at \$360 each.....	1,800
Two foremen of mechanics, at \$2,000 each.....	4,000
Six mechanics, at \$1,500 each	9,000
Six helpers, at \$360 each.....	2,160
Two clerks, at \$1,200 each.....	2,400
Two master laborers, at \$900 each	1,800
Eight laborers, at \$360 each.....	2,880
One chief storekeeper	2,400
Four clerks, at \$1,500 each.....	6,000
Two laborers, at \$360 each	720
Two storekeepers, at \$2,000 each	4,000
Two clerks, at \$1,500 each	3,000
Eight laborers, at \$360 each.....	2,880
Two dredges, at \$65,000 each.....	130,000
Two pile drivers, at \$5,000 each	10,000
Twelve scows, at \$1,000.....	12,000
Twelve scows, at \$300 each.....	3,600
Four steam tugs, at \$14,000 each	56,000
Two overseers, at \$2,400 each.....	4,800
Four master laborers, at \$900 each.....	3,600
Eighty laborers, at \$360 each.....	28,800
Supplies	50,000
One land clerk	1,800
Depreciation of masonry (one-half per cent on \$29,543,880).....	147,719
Depreciation of lock gates, operating machinery, etc. (7½ per cent on \$3,462,040) ..	259,653
Total	797,612

B. *Transit department.*—At the head of this department will be a general superintendent, at \$7,500 per annum. Attached to his office will be an assistant superintendent, at \$3,000; one chief clerk, at \$2,000; one stenographer, at \$1,500; two clerks, at \$1,500 each; two clerks, at

\$1,200 each; one surveyor, at \$1,800; one captain of the port, at \$2,400; one chief telegrapher, at \$1,800; one messenger, at \$400; office supplies, \$500.

The superintendent of the Panama Railroad will also be attached to this office. An allowance of \$1,000 per mile, or \$45,000, is made for maintenance. It is expected that receipts will cover transportation expenses. Under the captain of the port will be twenty pilots, at \$2,000 each; two light keepers, at \$900 each; and four sailors for tending buoys and range marks, at \$360 each. He will be provided with one steam pilot boat, at \$14,000; four steam tugs, at \$14,000 each; and two naphtha launches, at \$2,500 each. The surveyor will assist the captain of the port and remeasure vessels when necessary. Under the chief telegrapher will be a small force of linemen (say eight) at \$720 each, and fourteen operators (four at Colon, two at Bohio, two at Pedro, two at Miraflores, and four at Panama) at \$900 each. At Panama there will also be a captain of the port, at \$2,400; a surveyor, at \$1,800; two light keepers, at \$900 each; two clerks, at \$1,500 each; four sailors, for tending buoys and range marks, at \$360 each; one steam pilot boat, at \$14,000; four steam tugs, at \$14,000 each, and two naphtha launches, at \$2,500 each.

The pilots at Panama will be those already counted at Colon. At each lock there will be one lock master, at \$1,800; one assistant lock master, at \$1,200; one machinist, at \$1,500; two assistant machinists, at \$1,200 each; three lock foremen, at \$480 each; six gatemen, at \$360 each; twelve linemen, at \$300 each; three watchmen, at \$300 each, and general supplies may be placed at \$3,000 and lights at \$1,500.

Recapitulation for transit department.

General superintendent.....	\$7,500
Assistant superintendent.....	3,000
Chief clerk.....	2,000
Stenographer.....	1,500
Two clerks, at \$1,500 each.....	3,000
Two clerks, at \$1,200 each.....	2,400
Captain of the port at Colon.....	2,400
Surveyor at Colon.....	1,800
Chief telegrapher.....	1,800
Messenger.....	400
Twenty pilots, at \$2,000 each.....	40,000
Two light keepers at Colon, at \$900 each.....	1,800
Four sailors at Colon, end of canal, at \$360 each.....	1,440
One pilot boat at Colon.....	14,000
Four steam tugs at Colon, at \$14,000 each.....	56,000
Two naphtha launches at Colon, at \$2,500 each.....	5,000
Eight telegraph linemen, at \$720 each.....	5,760
Fourteen telegraph operators, at \$900 each.....	12,600
Captain of the port at Panama.....	2,400
Surveyor at Panama.....	1,800
Two clerks at Panama, at \$1,500 each.....	3,000
Two light-keepers at Panama, at \$900 each.....	1,800
Four sailors at Panama end, at \$360 each.....	1,440
One pilot boat at Panama.....	14,000
Four steam tugs at Panama, at \$14,000 each.....	56,000
Two naphtha launches at Panama, at \$2,500 each.....	5,000
Three lock masters, at \$1,800 each.....	5,400
Three assistant lock masters, at \$1,200 each.....	3,600
Three machinists, at \$1,500 each.....	4,500
Six assistant machinists, at \$1,200 each.....	7,200
Nine lock foremen, at \$480 each.....	4,320
Eighteen gatemen, at \$360 each.....	6,480

Thirty-six linemen, at \$300 each.....	\$10,800
Nine watchmen, at \$300 each.....	2,700
General supplies for locks.....	9,000
Lights for locks.....	4,500
Maintenance of railroad.....	45,000

Total 351,340

C. *Medical department.*—At the head of this department will be a chief surgeon at \$6,000 per annum. Attached to his office will be one medical inspector at \$3,000 and one clerk at \$1,800, one clerk at \$1,500, and one messenger at \$400. At Colon and Panama will be quarantine stations, at each of which will be one quarantine officer at \$2,400 per annum, and one naphtha launch at \$2,500. Emergency hospitals and dispensaries will be established at Colon, Bohio, and Pedro Miguel, each in charge of one assistant surgeon at \$2,000, one steward at \$900, and four nurses at \$500 each, with one cook at \$500, and two laborers at \$360. At Panama will be the general hospital, in charge of one surgeon at \$3,600, four assistant surgeons at \$2,000 each, two stewards at \$900 each, and twenty nurses at \$500 each, four cooks at \$500 each, and ten laborers at \$360 each. Hospital supplies, including surgical and medical stores, food and office supplies, may be put down at \$35,000.

Recapitulation for medical department.

Chief surgeon.....	\$6,000
Medical inspector.....	3,000
One clerk, at \$1,800; 1, at \$1,500.....	3,300
One messenger, at \$400.....	400
Two quarantine officers, at \$2,400.....	4,800
Two naphtha launches, at \$2,500.....	5,000
Three assistant surgeons, at \$2,000.....	6,000
Three stewards, at \$900.....	2,700
Twelve nurses, at \$500.....	6,000
Three cooks, at \$500.....	1,500
Six laborers, at \$360.....	2,160
One surgeon.....	3,600
Four assistant surgeons, at \$2,000.....	8,000
Two stewards, at \$900.....	1,800
Twenty nurses, at \$500.....	10,000
Four cooks, at \$500.....	2,000
Supplies.....	35,000
Ten laborers, at \$360.....	3,600

Total 104,860

D. *Finance department.*—At the head of this department will be a treasurer, at \$6,000. Attached to his office will be two collectors, at \$2,400 each; one teller, at \$2,400; one paymaster, at \$2,400; one chief clerk, at \$2,000; four clerks, at \$1,500; two clerks, at \$1,200; two messengers, at \$400. Office supplies may be placed at \$500.

Recapitulation of finance department.

Treasurer.....	\$6,000
Two collectors, at \$2,400 each.....	4,800
One teller.....	2,400
One paymaster.....	2,400
One chief clerk.....	2,000
Four clerks, at \$1,500.....	6,000
Two clerks, at \$1,200.....	2,400
Two messengers, at \$400.....	800
Office supplies.....	500

Total 27,300

E. *Law department*.—At the head of this department will be a solicitor, at \$6,000. Attached to his office will be a chief clerk, at \$2,000; two clerks, at \$1,500 each, and one messenger, at \$400. Under him will be a justice of the peace at Colon and one at Panama, who may be canal officials, and to whom \$500 extra pay may be given. Each will have one clerk, at \$1,200. Office supplies, \$500.

Recapitulation of law department.

Solicitor	\$6, 000
Chief clerk	2, 000
Two clerks, at \$1,500	3, 000
One messenger	400
Two justices of the peace, at \$500	1, 000
Two clerks, at \$1,200	2, 400
Office supplies	500
Total	15, 300

F. *Police department*.—At the head of this department will be a marshal, at \$6,000. Attached to his office will be one clerk, at \$1,500, and one messenger, at \$400. Posts will be established at Colon and at Panama, each to consist of 1 captain, at \$2,000; 2 lieutenants, at \$1,500; 12 sergeants, at \$1,200, and 90 privates at \$1,030 each. At each post will be maintained 20 saddle horses, at \$250 each.

Recapitulation for police department.

One marshal	\$6, 000
One clerk	1, 500
One messenger	400
Two captains, at \$2,000	4, 000
Four lieutenants, at \$1, 500	6, 000
Twenty-four sergeants, at \$1,200	28, 800
One hundred and eighty privates, at \$1,080	194, 400
Forty saddle horses, at \$250 each	10, 000
Total	251, 100

General summary.

General expenses in the United States	\$100, 000
Governor	39, 300
Engineer department	797, 612
Transit department	351, 340
Medical department	104, 860
Finance department	27, 300
Law department	15, 300
Police department	251, 100
	1, 686, 812
Add 20 per cent	337, 362
Total	2, 024, 174

Or, say, \$2,000,000.

The CHAIRMAN. Have you examined the statement that you made before?

Colonel ERNST. Yes. There is no essential change that I care to make. I simply would invite attention to the fact that on page 98, when I said that I thought the Alhajuela dam was necessary, I was referring to the French plan, and that included a dam at Bohio, considerably lower than our dam; I subsequently signed a recommendation that that dam be omitted, but it is a wholly different situation. The Bohio dam is much higher.

MEMORANDUM ON PANAMA CANAL LOTTERY BONDS, SUBMITTED BY COLONEL ERNST.

A lottery bond is a bond which, besides being a certificate of indebtedness, is also a lottery ticket which entitles its holder to participate in periodical drawings until it is redeemed.

The special law dated June 8, 1888, authorized the Panama Canal Company to issue such bonds to the extent of 600,000,000 francs, augmented by such sum, not exceeding 20 per cent, as should be necessary to establish a guaranty fund for the support of the lottery and the ultimate redemption of the bonds within ninety-nine years. The company issued, June 26, 1888, 2,000,000 bonds redeemable at 400 francs each and bearing about 4 per cent interest—15 francs per bond—per annum. The price at which they were to be sold was 360 francs, of which 300 francs was to go into the treasury of the canal company and 60 francs was to be turned over to an independent corporation organized for the purpose and entitled “*Société Civile d’Amortissement des Obligations a Lots du Canal de Panama.*”

The charter of this corporation requires it to hold six drawings per year for the twenty-five years between August 16, 1888, and June 15, 1913, and after that four drawings per year until all bonds are redeemed. During the first period there are 61 prizes at each drawing, or 366 prizes in a year, the value of the prizes being from 1,000 to 500,000 francs each. A bond drawing a prize is by that fact redeemed. During the second period there will be 59 prizes at each drawing, or 236 in a year. During this period a certain number of bonds, in addition to those drawing prizes, will be redeemed after each drawing at 400 francs each. Under this scheme all of the lottery bonds will be redeemed within ninety-nine years.

Of the 2,000,000 lottery bonds issued June 26, 1888, only 849,249 were sold. At 60 francs each the amount to be turned over to the lottery company was 50,954,940 francs, which was not enough to carry out the lottery scheme. The canal company therefore advanced to the lottery company 58,000,000 francs, of which part came from its treasury and the balance, 26,172,000 francs, was borrowed from a syndicate, the loan being secured by a deposit of 436,200 lottery bonds not sold. A further attempt to sell the bonds at 360 being unsuccessful, the canal company was forced to suspend payments. (First Report, p. 51.)

By the law of July 15, 1889, the liquidator was authorized to sell lottery bonds without interest and without limitation as to price. He sold 457,894 bonds at 95 francs each, and with part of the proceeds paid the loan from the syndicate and redeemed the bonds pledged as security for that loan. Subsequently he sold others. At the date of his fifth report—July 9, 1897—he had left 670,736 lottery bonds, and that is about the number now on hand. They all share in the drawings for prizes, but only 43,437 of these have paid their full dues to the lottery company. The remaining 627,299 have paid 38.32 francs each, which gives them the right to share in the drawings, but not to the redemption at 400 francs each independently of drawing prizes. To give them that privilege they must pay to the lottery company 21.68 each, with interest.

The lottery company has a capital of about 106,000,000 francs invested in Government bonds (rentes) or railway bonds guaranteed

by the Government, and producing an annual revenue of about 3,600,000 francs. It holds its bimonthly drawings regularly. The lottery bonds were quoted on the Paris Bourse, December 31, 1901, at 100 francs each, or 25 per cent of their nominal value. As they draw no interest they are now valuable simply as lottery tickets, but each one, except 627,299 of those held by the liquidator, is sure to draw a prize of not less than 400 francs before the year 1987, and these can be placed on the same footing as the others by paying 21.68 francs with interest.

The subcommittee then (at 3.05 o'clock p. m.) took a recess until Wednesday, February 19, at 10.30 o'clock a. m.

STATEMENT

OF

ALFRED NOBLE, C. E.,

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON INTEROCEANIC
CANALS, UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Friday, February 14, 1902.*

The subcommittee met at 10.30 a. m.

Present: Senators Morgan (Chairman), Hanna, and Foster of Louisiana.

Also Senators Kittredge, Millard, and Harris, members of the committee.

Mr. ALFRED NOBLE appeared and was duly sworn by the chairman.

STATEMENT OF MR. ALFRED NOBLE.

The CHAIRMAN. You were a member of what was called the Ludlow Commission?

Mr. NOBLE. Yes.

The CHAIRMAN. And also of the Isthmian Canal Commission?

Mr. NOBLE. Yes.

The CHAIRMAN. And you were not a member of any of these other commissions of investigation?

Mr. NOBLE. No; I was not a member of the first Walker Commission.

Senator HAWLEY. Did you not go to Paris?

Mr. NOBLE. Yes; as a member of the Isthmian Canal Commission. By the first Walker Commission, I mean the one composed of Admiral Walker, Colonel Hains, and Professor Haupt. They finished their work in 1899.

Senator HAWLEY. What do you call that commission of which Admiral Walker was chairman?

Mr. NOBLE. That is called the Nicaragua Canal Commission.

The CHAIRMAN. And then there was the Ludlow Commission, of which you were a member?

Mr. NOBLE. Yes.

Senator HANNA. The Ludlow Commission was previous to the Walker Commission?

The CHAIRMAN. Yes; the Walker Commission grew out of the fact that the Ludlow Commission did not have money enough to complete their investigation. Thereupon the Congress directed that a new commission of three to be created for the purpose of investigating the Nicaragua route. That Commission was headed by Admiral Walker.

Senator HAWLEY. I remember meeting the gentleman on the steamer.

Mr. NOBLE. That was a later Commission, Senator.

The CHAIRMAN. Then that Commission did not have time or money enough, although they spent six months at it, in actual work down there, to complete their investigation to the satisfaction of themselves or the country, and thereupon the Isthmian Canal Commission was constituted by act of Congress, the members to be selected by the President, and \$1,000,000 was voted, to which has been added the sum of \$85,000 or \$86,000 up to this time. I give that resumé of the general situation so that we may intelligently and directly examine Mr. Noble.

Senator HAWLEY. Will you permit one question before you begin?

The CHAIRMAN. Yes.

Senator HAWLEY. Has anybody, any individual, or set of individuals gone to France to investigate fully the financial condition of the company there?

The CHAIRMAN. Admiral Walker testified the other day that the Commission had gone there; that the Isthmian Canal Commission had gone to Paris and had spent six weeks there in making investigations, chiefly, however, in regard to the engineering. According to his statement they did not investigate what you call the financial condition to any great extent.

Senator HAWLEY. Do you not think that ought to be done?

The CHAIRMAN. I do not think anything is worth investigating for America, if we have to go to Paris to see how it looks. Professor Haupt and Mr. Pasco did not go to Paris. The balance of the Commission went. That is the situation as I understand it.

Mr. Noble, I might as well ask you now what length of time have you been a civil engineer and in what prominent works have you been engaged?

Mr. NOBLE. I was graduated as a civil engineer in 1870, and soon after that I went to the St. Marys Falls Canal, and was in local charge for twelve years, until 1882.

Senator HAWLEY. Were you graduated at West Point?

Mr. NOBLE. No; at the University of Michigan. From 1882 to 1895 I was on various works in various places, of various magnitudes. Among others, I was resident engineer of the bridge across the Mississippi River at Memphis and the bridge across the Ohio at Cairo.

In 1895 I was appointed a member of the Nicaragua Canal Board, in 1897 a member of the Deep Waterways Commission, and in 1899 a member of the Isthmian Canal Commission.

The CHAIRMAN. Have you examined the statement you made before this committee in 1900?

Mr. NOBLE. No; I have not looked that over recently.

The CHAIRMAN. I will get you to look that over and see if there is any part of that statement that you want to correct. I want to put it all in evidence, and I want to know if there is any part of it that you desire now to correct.

Mr. NOBLE. Since this examination, of course, we have studied all the matters connected with the projects very carefully. I do not see anything in my former testimony that I would change, excepting in regard to the cost of maintenance. On that point I stated at the time:

I would not say now that there would be any great difference in the two lines in the way of maintenance, although my mind is not made up on that point.

We have given that matter a good deal of consideration, and I now think there would be a very great difference in the cost of maintenance. Otherwise I stand on my previous statement.

The CHAIRMAN. Otherwise you adopt that statement as being your present statement?

Mr. NOBLE. Yes.

The statement referred to is as follows:

STATEMENT OF ALFRED NOBLE. MEMBER OF THE COMMISSION.

The CHAIRMAN. Mr. Noble, you are a civil engineer?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. Of how many years' experience?

Mr. NOBLE. About thirty.

The CHAIRMAN. You were not a member of the former Walker Commission?

Mr. NOBLE. No, sir.

The CHAIRMAN. You went with the present Commission to Nicaragua?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. And you made an examination of the canal route?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. And the country adjacent to it?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. You were on the Ludlow Commission?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. You have been on two commissions, but you were not on the intermediate Commission, the Walker Commission?

Mr. NOBLE. No; I was not on the Walker Commission.

The CHAIRMAN. You were on the Ludlow Commission. I think I have a copy of that report here, if you wish to look at it. You recommended the Nicaragua route as being a feasible, practicable route for a ship canal.

Mr. NOBLE. Yes, sir.

The CHAIRMAN. And now, since your examination under the second Walker Commission, do you adhere to that opinion, or have you any reason to change it?

Mr. NOBLE. I still think the route is feasible, Senator.

The CHAIRMAN. If you are willing to state it—I do not know that you are; I will not ask you to do so if you are not—have you come to a conclusion as to what would be a reasonable expenditure for the construction of the canal on the lower level, we will say?

Mr. NOBLE. I would not want to state it. My mind has not been made up on the subject.

The CHAIRMAN. Your former estimate was based upon an intermediate level, I believe, one between the Menocal level and—

Mr. NOBLE. It was based practically on the Menocal proposition.

The CHAIRMAN. Have you ever examined the report of the International Scientific Commission upon this canal question?

Mr. NOBLE. I do not think I have. I do not recall it. You mean of the Panama Canal?

The CHAIRMAN. Yes.

Mr. NOBLE. Oh, yes, sir; I read that. That is the technical commission.

The CHAIRMAN. Do you not understand that the technical commission condemned the effort to make a canal through there on a sea level or on two levels—a first or second level?

Mr. NOBLE. I do not recall it so, although it has been some time since I read the report. They recommend, as the Admiral stated, the three-level project, but I think they discussed the two-level project also.

The CHAIRMAN. They discussed it, as I understand it, but they recommend against the second level.

Mr. NOBLE. Yes; that is as I remember it.

The CHAIRMAN. They insist that there shall be three levels.

Mr. NOBLE. They prefer that.

The CHAIRMAN. And assign their reason for it?

Mr. NOBLE. Yes.

The CHAIRMAN. Have you any fact in your own mind that you can state that would indicate that the Panama Canal route, taking it as it is, as you found it, is preferable in any way to the Nicaragua Canal route?

Mr. NOBLE. I do not know that I can answer that question in any useful way. We can not make a comparative estimate of cost. We have not arrived at that. And the previous estimates do not aid us very much, because they have not been made on the same lockage facilities, on the same width of prism, and it is very difficult to see how the comparison would come out in that way. I believe it is possible either way, but which would be the cheaper I can not say. My mind is not at all made up about it. I have not even a belief on the subject.

The CHAIRMAN. When you were in Panama, did you form in your own mind any plan by which the lower reach of that canal in the direction of Colon could be protected against the influx of the flood of the Chagres River or other rivers that empty in there?

Mr. NOBLE. There did not seem to me to be any great difficulty in embanking that so as to make that project safe.

The CHAIRMAN. Do you recollect how many times the line of canal crosses the channel of the Chagres River?

Mr. NOBLE. I do not remember the number of times.

The CHAIRMAN. Is it not a large number of times, as many as twenty or twenty-one?

Mr. NOBLE. No; I should think not. There are a number of crossings of smaller streams, too, that give more or less trouble.

The CHAIRMAN. Did you think it was remarkable or abnormal that that canal channel should be silted up to the extent it has since they stopped work on it?

Mr. NOBLE. I think it is rather to be expected under the conditions.

The CHAIRMAN. If that is so, it would require either very large embankments, or else it would require a great deal of dredging to keep that canal down to its proper level, would it not?

Mr. NOBLE. The only practical solution would be to keep the river waters out. Dredging would certainly be very expensive.

The CHAIRMAN. Do you think the Chagres River, with a dam across it at Alhajuela or at Bohio, would furnish a safe, reliable, and steady supply of water for a ship canal?

Mr. NOBLE. That matter we have not gone into fully as yet. The records of the flood of the river seem to indicate that the water supply is ample; but for my own part I have not studied them.

The CHAIRMAN. Is not the Chagres River subject to great fluctuations in the dry season?

Mr. NOBLE. Yes; the floods there are very great.

The CHAIRMAN. And in the wet season it is very hard to control.

Mr. NOBLE. I think the project of the French engineers is ample to regulate floods.

The CHAIRMAN. In case of a very high flood on the Chagres River, fixing the bottom of the canal on the second level, do you think it would be a safe or easy matter to control that flood so as to keep it from passing through the canal toward the Pacific?

Mr. NOBLE. I do not see any difficulty about that, Senator. While the bed of the canal would be level in the second elevation, it would necessarily be horizontal at places, in order to provide uniform depth of navigation through the low-water season. In case of flood the surface of the water would be higher at the point where the Chagres River enters the canal, and that increase in that elevation of the surface would furnish the head necessary to carry the waters to the eastward. At the other end it is simply necessary to have a strong enough bank or strong enough lock gates to hold the additional head.

The CHAIRMAN. Would you rely upon the spillway? I suppose that is carried out of Lake Bohio as a means of controlling the flood waters in the Chagres River.

Mr. NOBLE. It is proposed to take care of the flood waters partly by discharge from the spillways and partly by discharge from Lake Bohio and the upper reservoir. The combination seems to be ample.

The CHAIRMAN. What is meant by the upper reservoir—the Alhajuela?

Mr. NOBLE. The Alhajuela reservoir; yes, sir.

The CHAIRMAN. What do you think of the difficulties of making a conduit in the case of a three-level canal from Alhajuela dam down to the canal?

Mr. NOBLE. I think that can be done successfully. It is a very rough country, and for a work of this size it will be expensive. It will not necessarily be a very large conduit. The general character has been described by the Admiral.

The CHAIRMAN. Would that conduit be a canal?

Mr. NOBLE. It would be more nearly a ditch.

The CHAIRMAN. A small canal?

Mr. NOBLE. A small canal.

The CHAIRMAN. But it would have all the characteristics of a canal, would it not?

Mr. NOBLE. In the sense that it carries water, and no other. The water would be at a higher velocity than would be permissible in a canal.

The CHAIRMAN. I mean as to the bottom of it and as to the walls or embankments?

Mr. NOBLE. It has to be water-tight, in that sense.

The CHAIRMAN. Do you know—did you form an opinion, upon your own observations—as to the practicability of doing that safely?

Mr. NOBLE. We went over the greater portion of the line on horseback, saw the most of the difficult sections, and studied the plans pretty carefully, and I did not myself see any difficulty.

The CHAIRMAN. Did it cross many ridges running down to the Chagres River?

Mr. NOBLE. It passes some with rather deep cuts, and would pass under some of the ridges in tunnels.

The CHAIRMAN. Is any of it level?

Mr. NOBLE. I think there is; but it is mostly hill country. They get in most places a level line by following the contours of the hillsides. They do that as far as practicable.

The CHAIRMAN. So that you think that if the water supply that is impounded above the Alhajuela dam is sufficient and steady, it can be confined to the canal safely?

Mr. NOBLE. I think so.

The CHAIRMAN. Through that distance of 10.10 miles, I believe is the accurate distance?

Mr. NOBLE. I think so.

The CHAIRMAN. In the case of a flood in the Alhajuela basin or in the Alhajuela Lake would there be any danger of that conduit becoming overcrowded with water?

Mr. NOBLE. I think not. They propose to have regulating works at the head of the conduits to control the amount of water admitted into them.

The CHAIRMAN. What is the general nature of the country—I mean now as to the geology—between the Alhajuela dam and the canal?

Mr. NOBLE. It is a rocky country. In the main the soil where it exists is clay soil. In the neighborhood of Alhajuela the rock is a calcareous sandstone. It seems to be massive there.

The CHAIRMAN. Is there any indication of its having been subjected to volcanic action?

Mr. NOBLE. Not in that vicinity.

The CHAIRMAN. Anywhere between Alhajuela and the canal?

Mr. NOBLE. I do not recall such a site.

Senator HARRIS. Admitting the feasibility of both lines and that within reasonable estimates the cost will not differ very greatly, I would like to ask Mr. Noble, so far as he is able to say, if there is any special advantage the Panama line has over the Nicaragua line?

Mr. NOBLE. The answer to that would involve the consideration of all these elements which we are required to study and report upon, and upon which I, for one, have not made up my mind.

Senator HARRIS. I was admitting the equal feasibility of both, and approximately the equal cost of both.

Mr. NOBLE. The main consideration would perhaps be the matter of distance and the different kinds of navigation.

Senator HARRIS. I had in view something with reference to maintenance.

Mr. NOBLE. I would not want to say now there would be any great difference in the two lines in the way of maintenance, although my mind is not made up on that point.

Senator HARRIS. I thought possibly the Panama line contemplated much greater subsidiary works than the Nicaragua line; that the cost of maintenance would probably be very materially enhanced.

Mr. NOBLE. On the other hand, it is a much shorter line.

Senator HARRIS. Of actual canalization, there is not much difference?

Mr. NOBLE. The excavation in the Nicaragua route is somewhere from 80 to 100 miles—not the canal, but the different kinds of excavation, river excavation, lake excavation, and so on, all requiring some maintenance.

The CHAIRMAN. What do you think of the practicability of dredging out and maintaining a harbor at Greytown?

Mr. NOBLE. I should think the maintenance of the harbor at Greytown would always require considerable dredging, but I have no doubt it can be done and that it is feasible from every point of view to do it.

The CHAIRMAN. Do you think a breakwater can be constructed out to deep water there, say 40 feet deep, that would divert the flow of sand along the coast?

Mr. NOBLE. I think it would collect the sand behind it, and eventually we would either have to provide for sand by dredging, or by some extension of the breakwater.

The CHAIRMAN. As long as the water remained 40 feet deep out at the extremity of the breakwater, it would not make much difference?

Mr. NOBLE. No; but I do not think that water will remain 40 feet deep for any great length of time.

The CHAIRMAN. But if it drifted up against the breakwater, in the case of one built there, then you would have to extend the breakwater?

Mr. NOBLE. That would cover it.

The CHAIRMAN. But that would imply, as I understand, that it is practicable to protect that harbor by a breakwater?

Mr. NOBLE. I think it is practicable to maintain a very good harbor at Greytown by a breakwater, or by dredging, or by a combination of both. I should have said by an extension of the breakwater.

Senator MCBRIDE. Upon the basis of Senator Harris's question regarding the relative advantages of the two canals, the considerations which are yet to be determined are those relating to distances, the convenience of navigation, and commerce generally, are they not?

Mr. NOBLE. And cost.

Senator MCBRIDE. Assuming, however, in his question the cost to be approximately equal, those would be the remaining considerations or elements in the case?

Mr. NOBLE. Yes.

The CHAIRMAN. There are no further questions, Mr. Noble, unless you have something to suggest.

Mr. NOBLE. I have nothing, I think, Senator.

The CHAIRMAN. I would like any of the commissioners to suggest anything he pleases in regard to this subject, because it is an exceedingly important one. This meeting is perhaps as important a meeting as we ever had in this Capitol.

Senator TURNER. Speaking about the question of cost, you have no idea that we can buy out the Frenchmen and complete this canal as cheaply as we can build the Nicaragua Canal, have you?

Mr. NOBLE. I do not know anything about the cost.

Senator TURNER. I was of course not inquiring specifically about your knowledge, but any impression you might have.

Mr. NOBLE. I do not know that I have any that would be useful. I have never arrived at any conjecture in my own mind as to what they would charge for the concession.

Senator TURNER. They would naturally charge all that they think they could get for the concession and for the work they have done, the money they have expended on it.

Mr. NOBLE. Of course.

The CHAIRMAN. In regard to the cost of maintenance, do you remember the itemized statement of the different features of that subject that you examined and weighed one against the other, in the two canals? Do you recollect the items?

Mr. NOBLE. No; the study was a rather extended one, and I could not carry all the items in my mind.

The CHAIRMAN. In the cost of maintenance did you include sanitation?

Mr. NOBLE. Yes.

The CHAIRMAN. Was that sanitation confined to the workmen and officers employed upon the canal and the railroad, or in connection with them, or did it include also the sanitation of the city of Panama and the town or city of Colon?

Mr. NOBLE. The allowance for sanitation was in the nature of a lump sum, and related mainly to the maintenance of a police, and control of all the conditions, sanitary and otherwise, for a strip 10 miles wide. That was the area we had in our minds.

The CHAIRMAN. The 10 miles wide would not include the city of Panama, would it?

Mr. NOBLE. I am not sure, but I think it would.

The CHAIRMAN. At the time you made up these estimates did you have in mind the sanitation of the city of Panama?

Mr. NOBLE. I certainly did.

The CHAIRMAN. Was any plan suggested or adopted in regard to that sanitation?

Mr. NOBLE. It was not worked out in detail.

The CHAIRMAN. In order to accomplish the sanitation of Panama, it would be necessary to have authority over the city, would it not?

Mr. NOBLE. I think so.

The CHAIRMAN. That would have to be military authority, if that was requisite.

Mr. NOBLE. It would have to be sufficient authority to give absolute control.

The CHAIRMAN. General works of sanitation or general schemes of sanitation are usually attended, I think, with a sufficient power behind them to compel obedience to the requirements of the surgeons and the persons who are skilled in sanitation.

Mr. NOBLE. That would certainly have to be the case on the Isthmus.

The CHAIRMAN. You did not compute, I suppose, what might be the result of the necessity to maintain a force in Panama sufficient to compel sanitation according to the rules that might be adopted.

Mr. NOBLE. We believed that our estimate would be sufficient to cover that, to include all necessary authority.

The CHAIRMAN. Do you remember what the estimate was for sanitation on the Panama Canal?

Mr. NOBLE. No, sir; I do not.

The CHAIRMAN. Is it stated in the report anywhere as a distinct item, separate from the balance?

Mr. NOBLE. I do not think it is.

The CHAIRMAN. At Colon did you make any estimate distinctly for the matter of sanitation?

Mr. NOBLE. It was considered in the same manner as at Panama precisely.

The CHAIRMAN. At Colon it would be still more necessary to have this power I have spoken of, because the canal enters right into the city.

Mr. NOBLE. It is absolutely necessary, I think, in either case.

The CHAIRMAN. How far is the exit of the canal on the west side at Panama from the city of Panama?

Mr. NOBLE. I do not know that I can give that exactly. I should think it would fall within the 5-mile limit. That can be easily ascertained from the map. I do not pretend to know.

The CHAIRMAN. While you were in Panama, was there any yellow fever there?

Mr. NOBLE. It was reported to be in Panama within a very few days of our passage through the place. I do not know whether there was any there at the moment we were in the place or not.

The CHAIRMAN. Well, is it your understanding that yellow fever is ever absent from that isthmus?

Mr. NOBLE. I do not know that it is always present, but I think the conditions are favorable for it.

The CHAIRMAN. Is not the liability to yellow fever or Chagres fever increased from the fact that you have distinct dry seasons and distinct wet seasons on that isthmus?

Mr. NOBLE. My opinion on that matter would not be worth very much, because I am not a sanitary engineer or a physician, but I should think that would be the case.

The CHAIRMAN. You think it would be?

Mr. NOBLE. I think it would be the case, but, on the other hand, on the western side of Nicaragua, where we have a distinct dry season, we have neither of the fevers.

The CHAIRMAN. You say they have a distinct dry season?

Mr. NOBLE. On the west side of Nicaragua.

The CHAIRMAN. They have no distinct dry season on the east side?

Mr. NOBLE. No; not at all.

The CHAIRMAN. It rains every day in the year?

Mr. NOBLE. Pretty nearly.

The CHAIRMAN. Have you ever been to the Hawaiian Islands?

Mr. NOBLE. No, sir.

The CHAIRMAN. The same conditions prevail on the east side of the Hawaiian Islands. It rains every day in the year on the east side and rarely or never rains on the west.

Mr. NOBLE. And the mountains are high, I suppose?

The CHAIRMAN. The mountains are high. In some places the island may not be more than 10 miles across, but it rains every day on the east side and does not rain at all on the west side.

Senator HARRIS. I understood you to say there was no fever at Nicaragua.

Mr. NOBLE. No yellow fever or Chagres fever. During the time our parties were engaged there we had fevers of various kinds, but nothing very severe.

Senator HAWLEY. What part of the work do you refer to, when you say there is no yellow fever there?

Mr. NOBLE. There has been no yellow fever in Nicaragua during the work of this Commission, or during the work of any previous Commission, so far as I know.

The CHAIRMAN. It is stated that there never was a case of yellow fever there.

Senator HARRIS. The Commission examined into the past record at Panama as to health, did they not?

Mr. NOBLE. Yes.

Senator HARRIS. Both as to the work under the railroad company and the work under the two canal companies?

Mr. NOBLE. Yes.

Senator HARRIS. What was the conclusion in regard to it?

Mr. NOBLE. Those are matters of history. It is clear that there was a large amount of yellow fever both during the time of the building of the canal and of the railroad.

Senator HARRIS. When the question was asked you a while ago as to the distance from the city of Panama to the mouth of the canal, I do not know whether you understood that question to mean the distance from the nearest point of the canal.

Mr. NOBLE. I did, sir.

Senator HARRIS. My impression was that at La Boca the canal line was not more than a mile and a half or such a matter from the city. Is that correct?

Mr. NOBLE. I should say 2 or 3 miles, but I am not positive about that.

Senator HARRIS. It would certainly be so close as to make the health conditions of Panama absolutely vital in the work of construction?

Mr. NOBLE. I think so, beyond question.

Senator HARRIS. And several gentlemen have stated, I believe, that they regarded it as necessary to have the city of Panama completely renovated and cleaned up in every possible way, so as to produce better sanitary conditions.

Mr. NOBLE. I agree with that entirely.

Senator HARRIS. You think that is true?

Mr. NOBLE. Yes.

Senator HARRIS. About what is the population of the city of Panama?

Mr. NOBLE. I think between 20,000 and 30,000, as I recall. The population, of course, would increase very quickly if construction were undertaken there.

Senator HARRIS. Then it would be necessary for the Government, or whoever was in charge of this work, to assume practically the complete police control?

Mr. NOBLE. I should think as completely as control was assumed at Santiago de Cuba or at Habana.

Senator HARRIS. Have you ever heard any estimate at all as to the cost of the sanitation of Santiago de Cuba?

Mr. NOBLE. No; I have not.

Senator HARRIS. There was a considerable time devoted to it, and undoubtedly a very large amount of money, I suppose.

Mr. NOBLE. Yes, sir.

The CHAIRMAN. I will ask you right there if you know or have

heard what the mayor of Panama is now demanding for sanitation purposes?

Mr. NOBLE. No; I have not.

The CHAIRMAN. Out of this trade we are making?

Mr. NOBLE. No; I have not.

Senator HARRIS. We should not only have to clean up Panama, but we should have to retain that kind of control over it?

Mr. NOBLE. I think that kind of control would have to be retained during the entire period of construction at any rate. Perhaps after the construction was finished it would not be necessary.

Senator HARRIS. There is no such thing as a sewer in Panama, is there?

Mr. NOBLE. Not that I know of. I think not.

Senator HARRIS. Everything of that kind would have to be begun from the ground up?

Mr. NOBLE. Yes, sir.

Senator HARRIS. In these two lines, generally speaking, the vital point hinges upon the maintenance of the summit level by dams in both cases?

Mr. NOBLE. That of course is vital to the maintenance of navigation.

Senator HARRIS. And the main difficulty of the work in each case?

Mr. NOBLE. I am not entirely sure as to that. The most difficult work in Panama, without any doubt, is the building of the dam which will maintain the summit level. But in Nicaragua there are a number of other works that approximate very closely in difficulty and in cost to the dam itself.

Senator HARRIS. Well, the dam in Nicaragua will cost very much less than the dam at Bohio?

Mr. NOBLE. Yes.

Senator HARRIS. The Commission gives the figures in its report?

Mr. NOBLE. Yes.

Senator HARRIS. It is probably about half, something like that?

Mr. NOBLE. About two-thirds, as I recall it now.

Senator HARRIS. It is of about half the length?

Mr. NOBLE. Yes.

Senator HARRIS. And the difference in height and all that is fully explained?

Mr. NOBLE. Yes.

Senator HARRIS. In the construction of that dam there are no very unusual difficulties?

Mr. NOBLE. Which dam do you refer to?

Senator HARRIS. Conchuda.

Mr. NOBLE. I should think the difficulties were rather unusual, perhaps, as far as the building of a dam was concerned. The method to be applied in building the dam at Conchuda is one that has not been applied, so far as I know, to the building of any dam heretofore; but I do not think the matter is beyond engineering experience. The methods to be used in building the dam are essentially those that have been used in placing bridge foundations.

Senator HARRIS. Simply sinking pneumatic caissons?

Mr. NOBLE. Sinking pneumatic caissons, yes; and, although the application is new, the methods of work are probably not new.

Senator HANNA. The same thing applies to the Bohio dam, does it not?

Mr. NOBLE. In the main, except that at Bohio the depth is very much greater, and the difficulty there would be considerably greater.

Senator HARRIS. Well, the difficulties in the two cases are indicated by the comparative depths and the extent of the work, I suppose, practically?

Mr. NOBLE. I think that would be fair, from an engineering standpoint. The difficulty of executing pneumatic work, of course, increases very rapidly with the depth, so that we could not assume for example that the difficulties of sinking caissons 200 feet deep would be only double the difficulties connected with sinking caissons 100 feet deep.

Senator HARRIS. They would more likely increase in proportion to the square of the depth?

Mr. NOBLE. They would increase from a possibility to an impossibility, I should judge.

Senator HARRIS. The depth to which this process is to be applied at Bohio is beyond any engineering experience that we have?

Mr. NOBLE. I think it is a little beyond any engineering experience we have; not very much. We believe, however, that by a process of pumping at the site, pumping on a large scale, the head of water can be reduced to that which has been successfully met elsewhere.

Senator HARRIS. You think that caisson work at Bohio will all be under water?

Mr. NOBLE. Yes.

Senator HARRIS. The permeable material there will permit the water to come in, so that it will require the water to be handled? There will be no current, of course, but it will all be under water?

Mr. NOBLE. It will all be under water. Otherwise there would be no need of putting in the caissons.

Senator HARRIS. It was suggested here yesterday that possibly there were spots or places where there would be no water.

Mr. NOBLE. Well, if it proved to be possible, as I think it will, to lower the water 20, 30, or 40 feet by means of pumping, that would apply to the caissons on the extreme ends of the line. That is, it might be possible to put in an open foundation, instead of it being necessary to put in a caisson, where the water is now only 20, 30 or 40 feet deep; but otherwise the same methods would apply.

Senator HARRIS. Of course that is indicated, because you provide that for everything higher than minus 30 it will be open work.

Mr. NOBLE. Yes, and we might extend that limit a little further.

Senator HARRIS. Simply by increased pumping?

Mr. NOBLE. Yes.

Senator HARRIS. Your examination of that site indicates that this permeable material, which lies along above the bed rock, communicates with the river at some point?

Mr. NOBLE. We found that to be the fact, apparently.

Senator HARRIS. Are you of the opinion that a dam must be absolutely impermeable to water in order to be safe?

Mr. NOBLE. I think it ought to be practically impermeable.

Senator HARRIS. That no form of dam that the water passed through or under could be safely depended upon?

Mr. NOBLE. I am not at all sure that there would be any very great danger of the destruction of such a dam, although the risk would be conceivable, perhaps, even if a small area were thus exposed; but the amount of water passing under the dam would increase with the area of cross section of the sand through which the water would pass, and I think that if the dam were not made impermeable in the whole section the amount of filtration might be so great as possibly to cause trouble with the water supply.

Senator HARRIS. Especially considering this head of water, 85 to 90 feet, that is estimated.

Mr. NOBLE. Yes.

Senator HARRIS. Do you think that any cheaper dam than this could probably be built there?

Mr. NOBLE. I should not advocate a cheaper dam than this.

Senator HANNA. You mean a cheaper form of construction?

Mr. NOBLE. Yes. I should not advocate a cheaper form of construction.

Senator HAWLEY. What is the estimate of the cost of it?

Senator HARRIS. \$8,000,000, I believe.

Mr. NOBLE. \$6,400,000 for the Bohio dam.

Senator HARRIS. I was going to ask you with regard to the cost of a temporary dam which, as perhaps you know has been stated here, was not included in that estimate.

Mr. NOBLE. I find that an allowance of half a million dollars was made for a temporary dam in the estimates.

Senator HAWLEY. I should suppose a temporary dam would require as much protection against the seepage and leaking as the permanent dam.

Mr. NOBLE. It is necessary that the permanent dam shall be free from much seepage to maintain the water supply, but the temporary dam would simply be used during construction and moderate seepage would not be a very important matter.

The CHAIRMAN. Then I understand your answer to mean that you would not consider a dam sufficiently permanent that admitted of seepage through the strata upon which it rested.

Mr. NOBLE. I should not consider it to possess the requisite amount of certainty as a protection for that navigation. I could not say that it would give way, and I could not predict with certainty that the seepage would be very serious, but I should apprehend it.

The CHAIRMAN. You would not advise the building of a dam upon such a foundation?

Mr. NOBLE. No, sir.

Senator HARRIS. This core which is recommended by the Commission and indicated in the plans there is not intended to add any resisting power to the dam, but merely to cut off the seepage?

Mr. NOBLE. I should consider that its office.

Senator HARRIS. That is its office in construction?

Mr. NOBLE. Yes.

Senator HARRIS. The mass of the material of stone, both above and below, is what gives the resistance?

Mr. NOBLE. Yes; of stone or earth.

Senator HARRIS. None of the witnesses have given this committee a distinct description of a concrete dam. Will you be kind enough to do that, so we may know what a concrete dam is made of, and how the concrete is worked into the dam?

Mr. NOBLE. For the Bohio dam we propose to sink a line of caissons across the river. These caissons will be built of steel. They will have at the base an open chamber; open at the bottom, water-tight at the top, in which men can work, to make the excavation underneath, so that the caisson will gradually settle into the material. The space above the working chambers will be filled with concrete composed of Portland cement and sand and gravel or broken stone, such as is very commonly used in public works everywhere.

Senator HAWLEY. What is meant by concrete—sand and broken stone?

The CHAIRMAN. That is what is meant by concrete.

Mr. NOBLE. Yes; a mixture of cement, sand, and broken stone.

The CHAIRMAN. Does it make a firm and solid rock?

Mr. NOBLE. Oh, yes.

Senator HARRIS. About what would be the atmospheric pressure under which the men would have to work in those caissons at a depth of 128 feet?

Mr. NOBLE. Approximately 55 or 56 pounds to the square inch.

Senator HARRIS. How long do you think men could stand it—what length of shift?

Mr. NOBLE. I presume at those depths men could not work more than three-quarters of an hour three times a day. In the building of the Memphis bridge we worked for several weeks at depths exceeding 100 feet, and our shift there was one hour, and there were three of those in each day, that is, each man worked three hours a day.

Senator HARRIS. A man worked three hours a day?

Mr. NOBLE. Yes.

Senator HARRIS. Being relieved every three hours?

Mr. NOBLE. Working one hour and then not working again until the end of the other shifts.

Senator HARRIS. Three hours in a day of twenty-four hours or three hours in a day of twelve hours?

Mr. NOBLE. Working three hours a day in a day of twenty-four hours.

Senator HARRIS. What would be reasonable to expect as to the injury to the men? Some men, of course, can not work at all under that pressure, and a certain percentage of injury results from work of that kind. Have you any idea of what might be expected?

Mr. NOBLE. I think at Memphis we lost 4 men by death, and we had a considerably larger number injured more or less, and our force in the caissons would average perhaps 120—not at a time, but 120 during the twenty-four hours.

Senator HAWLEY. Under what pressure?

Mr. NOBLE. The pressure ran up to about 48 pounds.

Senator HAWLEY. To the square inch?

Mr. NOBLE. To the square inch.

Senator HAWLEY. Do you think a man can live under that pressure?

Mr. NOBLE. Yes; otherwise I should not be here.

Senator HANNA. You have been there?

Mr. NOBLE. Oh, yes; I used to go in every day.

Senator HARRIS. So that a very considerable percentage of deaths and of permanent injury would naturally follow from this, which would be still greater in the case you mention?

Mr. NOBLE. I should presume that the loss would be somewhat greater than I have mentioned as the depth increased. We had more than 120 different men in all at work, of course.

Senator HANNA. What do you estimate the difference in pressure between the depths given in testimony here as depths to which caissons have been sunk, that is, depths of 110 to 115 feet, and a depth of 128 feet? What do you estimate the difference in pressure between 115 and 128 feet in depth?

Mr. NOBLE. Between 5 and 6 pounds to the square inch.

Senator HARRIS. There is another thing that occurs to me. I do not know whether it would make any difference. Of course this pressure at the Memphis bridge and at St. Louis, where the depth was 110 or 115 feet, does not mean below sea level. In this case it is 128 feet

below the level of the sea. To what extent would that change or increase the pressure, or would it materially affect it?

Mr. NOBLE. I do not think it would materially increase it. The level of the Chagres at Bohio at low water is practically sea level, and I do not see why the pressure should be materially increased. Of course if it were salt water the pressure would be increased in the ratio of 64 and something to 62½.

Senator HARRIS. Of course this pneumatic pressure will be used for about half the distance, and to the depth of 82 feet at Conchuda. That is the maximum depth.

Mr. NOBLE. Yes; 82 or 83 feet.

Senator HARRIS. That of course will mean a somewhat less pressure.

Mr. NOBLE. Yes.

Senator HARRIS. And somewhat less difficulty.

Mr. NOBLE. Yes. At the same time I think it is quite possible to reduce or lower the water level by pumping at Bohio, so that the pressure may possibly be about the same. That can not be said with certainty, of course, until the trial is really made. The effect of lowering the water level under the ground has been accomplished elsewhere.

Senator HARRIS. Cofferdamming at Conchuda and openwork might be considerably increased, according to the stage of the river, I suppose?

Mr. NOBLE. Well, this depth of 82 feet refers to a rather low stage in the river. During very high water in the San Juan it will probably be necessary to suspend work for a very short period.

Senator HARRIS. In the question of harbors on these two routes, do you think that after they are constructed—and the figures indicate that it will cost more to construct the harbor at Colon and to do the necessary dredging in Panama than on the Nicaragua line—would there be any advantage in the Panama line over the Nicaragua line?

Mr. NOBLE. I do not think the advantage will be appreciable. I think that good working harbors can be made and maintained on either route.

Senator HARRIS. The cost of maintenance is somewhat greater on the Panama line, I believe, than on the Nicaragua?

Mr. NOBLE. No; I think the reverse is true, Senator. I think Greytown would be the most expensive.

Senator HARRIS. Yes, \$50,000 at Greytown and \$30,000 at Colon.

Mr. NOBLE. The amounts were stated in the report.

Senator HANNA. The figures stated in the Commission's report were \$100,000.

Mr. NOBLE. Yes.

The CHAIRMAN. May I interrupt right there to ask a question of a general character?

Senator HARRIS. Yes, certainly.

The CHAIRMAN. I want to ask if a number of the best harbors in the world are not entirely artificial?

Mr. NOBLE. Yes, I think that is so.

The CHAIRMAN. Can you name some of them?

Mr. NOBLE. I would not undertake to name a great many. The harbor at Marseille is principally artificial. Other harbors on the French coast and on the Channel coast are so nearly produced by artificial means that they might practically be called artificial harbors.

The CHAIRMAN. All of them?

Mr. NOBLE. All of them, practically.

The CHAIRMAN. Unless it is Portsmouth?

Mr. NOBLE. I was thinking of the French harbors at the moment.

The CHAIRMAN. Portsmouth is very largely an artificial harbor, is it not?

Mr. NOBLE. There are very expensive piers at Portsmouth.

The CHAIRMAN. Havre and Calais and Dover are all artificial harbors.

Mr. NOBLE. Yes; in that same sense.

The CHAIRMAN. And are they not better and safer—that is, better adjusted to the needs of commerce and freer from the dangers of navigation from the sea—than natural harbors ordinarily are?

Mr. NOBLE. I do not know that I would say that. The finest harbors in the world are natural harbors; New York Harbor, for example, and San Francisco Harbor.

The CHAIRMAN. San Francisco Harbor is a dangerous harbor to enter and get out of in heavy weather, is it not?

Mr. NOBLE. I presume it might be a little difficult to enter in very heavy weather, because they could not see the signals, perhaps.

The CHAIRMAN. There have been a number of very unfortunate wrecks right in the mouth of the harbor.

Mr. NOBLE. Yes; I know there have.

The CHAIRMAN. Some very recently, and very bad ones.

Mr. NOBLE. Yes.

The CHAIRMAN. That was the interruption I wanted to make.

Senator HARRIS. There would be no danger to be apprehended, I should say, in maintaining the harbor at Greytown or at Brito?

Mr. NOBLE. I do not think the maintenance at Brito will be very expensive, but the maintenance at Greytown I should think would be.

Senator HARRIS. What is there at Brito that requires this estimate for maintenance in the harbor there?

Mr. NOBLE. It would require something in the way of repairs to the breakwater, to keep the breakwater in condition, and probably there would be some little movement of the sand along the beach, and the estimate for maintenance is put in as safely covering any probable expenditure there.

Senator HARRIS. It would not be anything serious?

Mr. NOBLE. I should think not.

Senator HARRIS. The idea is to dig that out and protect it from the sea in every way; and I could not see just what material expense could be incurred there for maintenance.

Mr. NOBLE. I do not think the expense will be large.

Senator HARRIS. Do you apprehend any difficulty with any cuts on the Nicaragua line in the way of the sliding of loose material?

Mr. NOBLE. I should not apprehend any serious difficulty, but that can not be predicted with certainty. In the neighborhood of the Conchuda dam we have some pretty deep cuts in clay, and in rock underlaid by clay, but we think we have made our estimates large enough for safety; but we can not be sure, of course, that they will be absolutely safe until they are made.

Senator HARRIS. Those cuts are not very long.

Mr. NOBLE. They are not very long, but for a distance of 3 or 4 miles in going west they are pretty heavy, in the neighborhood of the Conchuda dam.

Senator HARRIS. How would you compare the difficulties of those cuts with the Culebra cut?

Mr. NOBLE. In the way of maintenance and construction?

Senator HARRIS. State construction first, and then maintenance.

Mr. NOBLE. The Culebra cut, in the first place, is very much larger. We have at Culebra a cutting of 43,000,000 yards, mostly classified as

soft rock, in a distance of 8 miles, and the largest single mass of cut work in Nicaragua is the West Divide cut, which contains between 18,000,000 and 19,000,000 yards in a distance of 9 miles; and I think as far as those two cuts are concerned the magnitudes represent possibly fairly well the difficulty.

I think the West Divide cut at Nicaragua would be the better work, if anything. On the eastern side of Nicaragua we have this cut that I was just speaking of near the Conchuda dam, where there is between four and five million cubic yards of material; and there is the Tamborcito cut, where there are nearly 5,000,000 yards, and other localities, where the work approximates that, somewhat less; and those are in a country where there would likely be more difficulty in the construction, because of the constant heavy rains; but I do not think that any one of them would compare in cost or in duration with the Culebra cut.

Senator HANNA. I understand from what you say, Mr. Noble, that in all of this cutting on either route it is a question of magnitude, and not particularly any difference in the physical difficulties.

Mr. NOBLE. Excepting those resulting from climate, rainfall, and matters of that sort.

The CHAIRMAN. And as to cost—the ability to get the necessary number of men into the Culebra cut, sufficient to handle the work?

Mr. NOBLE. Yes; the work on the Panama route is largely concentrated at the Culebra cut.

Senator HARRIS. Of course, at Nicaragua it is distributed so that it can be conducted more rapidly?

Mr. NOBLE. Yes; but it requires at Nicaragua a large force at a great many points, whereas at Panama the problem is mainly in the Culebra cut.

Senator HANNA. Have not all these difficulties been taken into consideration in the summary of your report, so that in arriving at your conclusions those considerations have been included, pro and con, as to the time it would take to do the work and the comparative magnitude of the work?

Mr. NOBLE. Yes.

Senator HANNA. So that all we need to consider are the results as you have given them in your report?

Mr. NOBLE. That is the result of our study.

Senator HARRIS. At the same time there are some differences of opinion among the individual members of the Commission.

Senator HANNA. As to what?

Senator HARRIS. We have already had them on several points.

Senator HANNA. As to time or possibility?

Senator HARRIS. As to the relative merits, and as to their involving uncertain features. For example, one member of the Commission thinks that the impermeable material under the Bohio dam can be practically ignored.

Senator HANNA. I am talking about the cuts.

Senator HARRIS. I am speaking of the general features. We may develop differences about the cuts. The Tamborcito cut is all rock, I believe.

Mr. NOBLE. Practically so.

Senator HARRIS. And that would be available in the construction of the work.

Mr. NOBLE. It appears to be good rock for concrete.

The CHAIRMAN. While we are on that branch, there is one inquiry I want to make for my own information, and the information of the

committee. What is the depth and width of the cut that is requisite, on the plan adopted by the Isthmian Canal Commission, to get the control of, or to get rid of the waters of the Chagres River opposite Gatun, on the left bank of the canal, where they have gathered after they have passed over the Gigante spillway?

Mr. NOBLE. The estimate of the Commission simply provides for a channel area large enough to permit the largest amount of water we expect to be possible over the spillway, without dangerous velocities.

The CHAIRMAN. What would be the dimensions of that cut?

Mr. NOBLE. I do not remember now what they would be.

The CHAIRMAN. It would be very large, would it not?

Mr. NOBLE. It would have to be very large, as we expect from 100,000 to 140,000 cubic feet of water per second would have to pass through it.

The CHAIRMAN. It would be wider than at any other part of the canal on the entire Panama line?

Mr. NOBLE. It would be wider than any portion of the canal proper, I have no doubt.

The CHAIRMAN. That is what I mean.

Mr. NOBLE. The canal section would not be sufficient to pass that.

The CHAIRMAN. It would be twice as wide, would it not?

Mr. NOBLE. Probably.

The CHAIRMAN. How deep would it be?

Mr. NOBLE. That would depend upon its width, of course.

The CHAIRMAN. I was thinking of the areas of the cross sections. Would it have a less depth than 35 feet?

Mr. NOBLE. I presume it would be economical to make the depth less than 35 feet and increase its width. That would depend upon topography, whether the depth could be increased without getting into the hillside too far.

The CHAIRMAN. About how long would it be?

Mr. NOBLE. I don't remember that. I would have to refer to the map for that.

The CHAIRMAN. Is that through a hill?

Mr. NOBLE. I do not think there is any very high hill that would have to be crossed. The ground is above sea level there, of course, but I do not think it is very high.

The CHAIRMAN. How does the ground through which this cut is to be made compare with the ground that you have just been speaking of, between Lock No. 4 and the San Juan River?

Mr. NOBLE. It is not so hilly as that. That is my recollection. It is not so rough as that.

The CHAIRMAN. Now, in the Ludlow Commission, of which you are a member, did you make a location, or a recommendation of a location, for a dam on the San Juan River?

Mr. NOBLE. No; no special location. We simply recommended that a search should be made for a site where a masonry dam could be built.

The CHAIRMAN. Did you find anything at Boca San Carlos that you thought was sufficient?

Mr. NOBLE. We had no funds to make any physical examination for that purpose.

The CHAIRMAN. When the Isthmian Canal Commission bored at Boca San Carlos you found a certain depth of earth and water above the rock. Do you remember that depth?

Mr. NOBLE. I believe it is over 100 feet—considerably over 100 feet, as I now recall it.

The CHAIRMAN. Did you find a continuous rock bottom across the San Juan River at this point?

Mr. NOBLE. At the point we call Boca San Carlos, a little above the mouth of the San Carlos.

The CHAIRMAN. A mile or such a matter?

Mr. NOBLE. Yes.

The CHAIRMAN. And not being satisfied with that, you moved up about 4 miles, to Conchuda?

Mr. NOBLE. These examinations were made simultaneously.

The CHAIRMAN. And you moved the location of the dam about 4 miles up the San Juan River to Conchuda?

Mr. NOBLE. Yes.

The CHAIRMAN. And that made it necessary to cut this canal you speak of through this difficult cut?

Mr. NOBLE. Yes; that made it necessary to do that, although the change had much to recommend it in other ways.

The CHAIRMAN. What was the fact that determined the Panama Canal Commission to select Conchuda, rather than Boca San Carlos?

Mr. NOBLE. Easier construction for the dam and, as I recall it now, less total cost.

The CHAIRMAN. Less total cost and easier construction?

Mr. NOBLE. I think I am right as to less total cost.

The CHAIRMAN. Was not the depth of solid rock the controlling factor in that choice?

Mr. NOBLE. I do not know that it was the controlling factor. The construction of the dam was very much easier at 82 feet than at something in excess of 100. That was not the only reason. The abutments at Conchuda are a very much better class of rock than one of those at Boca San Carlos.

The CHAIRMAN. And you think the differences between the two locations, one being a little in excess of 100 feet and the other being about 87—

Mr. NOBLE. Eighty-two or 83, if I recollect right.

The CHAIRMAN. You think those differences were sufficient to justify the Commission in locating the dam at Conchuda, notwithstanding that it required the cutting of 4 miles more of canal through this difficult cut?

Mr. NOBLE. I do not think the comparative cost was against the Conchuda site at all, and the route as we now have it developed with this cut is better than the former one for navigation.

Senator HARRIS. There has been a good deal said here with regard to the superior advantages of a sea-level canal, with a tunnel, east of the Panama location. Were you a member of the commission that made any examination as to those routes?

Mr. NOBLE. We had field parties at two or three points in the Darien Isthmus; among others, the particular site you refer to.

Senator HANNA. Is that the San Blas route?

Senator HARRIS. The Mandingo River route?

Mr. NOBLE. Yes.

Senator HARRIS. What was your conclusion as to the general character of the cordillera there?

Mr. NOBLE. It was very difficult to arrive at any definite conclusion in regard to it. It is impossible to tell what there is 400, 500, or 600 feet below the surface of the ground.

Senator HARRIS. It would require borings?

Mr. NOBLE. It would require a very extensive examination, requiring much time and outlay, to determine whether that tunnel is really feasible or not.

Senator HARRIS. And any geological or topographical map of that

country would require the expenditure of a very large amount of money, and very large parties in the field for a considerable time?

Mr. NOBLE. I think so, without doubt.

Senator HARRIS. No man, simply walking over the country through that jungle, could arrive at any conclusion with reference to anything?

Mr. NOBLE. I think not.

Senator HARRIS. The reasonable supposition that the Commission entertain, I understand, is that a tunnel could only be safe if absolutely and securely lined.

Mr. NOBLE. I think the probabilities are that we should have to line it, to put in even more lining than we suggested in our report. We intended to make that report represent a probable minimum cost, the conditions on the whole favorable; perhaps not on the whole the very best; but this lining we put in we thought would be the least probable average lining that would be required in that tunnel.

Senator HARRIS. Five feet of concrete?

Mr. NOBLE. Yes.

Senator HARRIS. That would be a very difficult and expensive piece of work, as a matter of course?

Mr. NOBLE. I should think so.

Senator HARRIS. How would the operation of a canal through a tunnel compare, in your judgment, with the operation of a canal through locks?

Mr. NOBLE. I should not expect a great deal of difficulty in operating a canal through a tunnel 2 miles long, and I do not think that there is any great difficulty about operating a canal with locks. I think that St. Marys Falls Canal has demonstrated that; at the St. Marys Falls Canal there is an unusually large commerce passing through locks, with very little delay.

Senator HARRIS. Something has been said here about transit through the tunnel by means of some system of electrical trolleys. Do you regard anything of that sort as feasible and practicable?

Mr. NOBLE. I am not an electrical engineer. I would not want to express an opinion as to what can be done with electrical power.

Senator HARRIS. As the opinion even of a layman, I should like to know whether a vessel could not be operated by her own steam through a straight, level tunnel just as easily as by using any artificial means, such as an electrical trolley system?

Mr. NOBLE. Unless the traffic were very heavy I should think there would be no great difficulty in steaming through. If the traffic were very heavy it is possible the air might become quite impure.

Senator HARRIS. In the tunnel?

Mr. NOBLE. Yes, in the tunnel. That might possibly become a practical objection.

Senator HARRIS. One of the difficulties involved in a tunnel is the ventilation.

Mr. NOBLE. Yes.

Senator HANNA. Could not that be ventilated?

Mr. NOBLE. I would not want to say that it could not be.

Senator HANNA. In Mr. Serrell's argument he made this statement, that in this range of hills through which the tunnel would have to be built there were declivities at three points, so that by measurement it was shown that shafts could be sunk into each one of these depressions within 400 feet of the apex of the tunnel, and in the construction of the tunnel those shafts could be used to advantage in hoisting the rock, because that would give them so many additional faces to work on, and

when the tunnel was completed that those shafts could be used for ventilating shafts. That was his argument.

Mr. NOBLE. I think that is quite plausible.

Senator HANNA. Yes, I think so too, as far as that part of it is concerned.

Senator HARRIS. Do you think if you were undertaking to construct a tunnel of that kind, that you would undertake to remove the material through shafts along the line of the tunnel instead of using the tunnel itself for the removal of the material?

Mr. NOBLE. I am inclined to think that I should, in order to save time, in a great work of that sort.

Senator HARRIS. Even if the shaft was 400 feet in height?

Mr. NOBLE. Yes.

Senator HARRIS. Now, as a mechanical engineer, suppose you have, in a country of that character, a preliminary survey from a point like the bay of San Blas over to the point on the other side, which follows the streams and does the usual amount of meandering which you know would be required in that country, do you think it would be a feasible thing for anyone to place a straightedge upon the map between the terminal points and draw a line and give any idea as to the amount of excavation, or the work to be encountered on that straight line?

Mr. NOBLE. I do not think that there are any surveys that form a basis for such an estimate.

Senator HANNA. Are there any streams in that route?

Senator HARRIS. Oh, yes; the Mandingo River—a considerable stream. Did you ever hear of a survey across the isthmus at Mandingo Bay to Pearl Island on the other side?

Mr. NOBLE. As I understand it the surveys of Mr. Kelley, made forty or fifty years ago, covered that territory.

Senator HARRIS. This was supposed to be made under the auspices or by the aid of Mr. Kelley?

Mr. NOBLE. Yes.

Senator HARRIS. Have you seen any of those notebooks?

Mr. NOBLE. No; I have not.

Senator HARRIS. Was any matter of that kind laid before the Commission?

Mr. NOBLE. No, sir. General Sewell mentioned them, and proposed to send them to the Commission, but for some reason did not do so.

Senator HANNA. Are those the Kelley surveys that General Sewell had?

Senator HARRIS. Yes; he authorized several lines to be run down there and this was one of them.

Senator HAWLEY. A question for information: You speak of lining the tunnel. What would it be lined with—arch work, stone?

Mr. NOBLE. With concrete, according to our estimate—artificial stone.

Senator HAWLEY. In blocks, or laid up in a wall?

Mr. NOBLE. Probably laid up continuously.

The CHAIRMAN. Senator Foster desires to ask some questions.

Senator FOSTER, of Louisiana. Mr. Noble, the success of the whole Panama enterprise depends upon the successful and safe construction of the Bohio dam, does it not?

Mr. NOBLE. I think so; yes.

Senator FOSTER, of Louisiana. If that dam should be a failure, then the whole enterprise would be a failure. In your opinion are there any untried features or any unknown factors in the construction of that dam?

Mr. NOBLE. The work has not been exactly paralleled, but the methods to be used in it have been used successfully in a great many places.

Senator FOSTER, of Louisiana. In an article written by Mr. Morison, he declares that the construction of this dam—

involves novel and untried features. Few engineers, even among those who feel that they could construct it, would be ready to say in advance how the work would be done. The difficulties, taken in connection with the climate and other surroundings, are enormous.

Do you indorse those views?

Mr. NOBLE. I do not think the work has been paralleled in all its details; and, in fact, in no such large work could you expect that you could foresee what would occur.

Senator FOSTER of Louisiana. Are there any such untried features or uncertain elements which enter into the construction of the Nicaragua Canal as are involved in the construction of the Bohio dam?

Mr. NOBLE. The Conchuda dam would have to be built by very much the same method as the Bohio dam. Foundations would have to be put in by the pneumatic process the same as the foundations of the impervious wall at Bohio, the difference being in the depth to which it would be necessary to go. At Conchuda the maximum depth would be about 82 or 83 feet below the ordinary low water of the river.

At Bohio the depth would be about 128 feet below low water in the Chagres River, or, what is about the same thing, below sea level. If the surface of the ground water can not be lowered, then the depth there would exceed anything that has been reached by the pneumatic process heretofore, I think. If it can be lowered even 15 feet, it will be brought within the depths that have been reached before; and the ground water level has been lowered in other places by pumping, so that in both those respects it is probable that the Bohio dam can be built without entering into conditions that have not been met successfully heretofore.

Senator HANNA. You have stated that you are a member of this Commission, and have given your experience as an engineer?

Mr. NOBLE. Yes.

Senator HANNA. You have signed the report of the Commission. In the next to the last clause of that report is this statement:

There are certain physical advantages, such as a shorter canal line, a more complete knowledge of the country through which it passes, and lower cost of maintenance and operation, in favor of the Panama route, but the price fixed by the Panama Canal Company for a sale of its property and franchises is so unreasonable that its acceptance can not be recommended by this Commission.

In making that statement the Commission virtually decided that if the price fixed by the Panama Canal Company had been reasonable they would have recommended the Panama route?

Mr. NOBLE. That could be assumed, I think, and that was the case as shown later.

Senator HANNA. That was the case?

Mr. NOBLE. That was the case later.

Senator HANNA. And that when the Panama Canal Company lowered their price from \$109,000,000 to \$40,000,000 the Commission decided to recommend, in their supplemental report, the acceptance of that proposition of the Panama Canal Company?

Mr. NOBLE. Yes.

Senator HANNA. You concurred in that opinion?

Mr. NOBLE. Yes.

Senator HARRIS. Just there, if you will allow me to interrupt you, of course all of this was conditional upon a great many other factors which would have to be settled by the Panama Company.

Senator HANNA. Please state what, in detail.

Senator HARRIS. I am speaking of what the Commission states there in its report, the question of transfer, concession, and the change in the character of concession.

Senator HANNA. Of course.

Senator HARRIS. And the legal rights should all be settled?

Senator HANNA. That goes without saying.

Senator HARRIS. In other words, that this recommendation was a conditional recommendation?

Mr. NOBLE. It was based upon that, and upon the assumption that the concessions could be obtained on about the same terms from either of the respective governments.

Senator HANNA. Assuming that the concessions could be obtained on both routes.

Senator HARRIS. I merely wanted to indicate this. I wanted to get the statement of the witness that it was a conditional recommendation.

Senator HANNA. I do not want your understanding of the matter left in that way. I am inquiring of Mr. Noble as an engineer, from an engineering and practical standpoint, on the merits of the two routes, and saying nothing about concessions or titles; purely as an engineering proposition and a practical proposition, the recommendation was made in favor of Panama?

Mr. NOBLE. Do you mean without regard to the cost?

Senator HANNA. The estimates of cost were there before you, on the basis of your report.

Mr. NOBLE. On the basis of equal cost of the two routes my preference would be for the Panama Canal.

Senator HANNA. And there is a difference of cost on the two routes of \$5,000,000?

Mr. NOBLE. Yes.

Senator HANNA. Then, taking the situation as it stands to-day, in your judgment it would be a better proposition for this Government to accept the offer of the Panama Canal Company, provided the title was made good and provided the concessions were agreed upon satisfactorily?

Mr. NOBLE. Yes.

Senator HANNA. Now, Mr. Noble, I want to get your own ideas as to the influences upon your judgment that led you to that conclusion, and I would prefer to have you take it up in your own way and give it in a story of your own manufacturing; that is, in your own way, just why you were led to this conclusion, if you have the data which you can give connectedly.

Mr. NOBLE. Well, the matter of course presents itself to us in the first place in regard to the natural conditions on the two routes; second, in regard to the facilities provided on the two routes for the commencement and prosecution of the work; third, the difficulty of construction when the work is once undertaken, and, finally, the value of the route when completed.

As regards the existing conditions, the sanitary question is a very important one, and I do not think there is any doubt—I do not think it will be disputed at all—that the health conditions in Nicaragua now are very much better than in Panama. The large working forces we had under our Commission and the somewhat smaller forces under

prior ones have enjoyed, as a whole, very good health in Nicaragua, notwithstanding the extremely unfavorable conditions under which they worked. Our working parties on the east side were up to their waists in water perhaps nearly every day, and still they came out in better condition a good deal than they would in working in the Mississippi River bottom anywhere below Cairo. That is a good illustration, I think—a very good one.

The CHAIRMAN. What line are you speaking of now?

Mr. NOBLE. Nicaragua. The Nicaragua parties are the ones I refer to. In October, 1900, there was considerable malaria among our force, but much less, I am confident, than would have been the case in the Mississippi River bottom.

Now, in Panama we had small working parties down there twice. The first time there was not a great deal of malarial fever, but there was some, more I think than we have ever had in Nicaragua in proportion to the force; and our chief engineer had an attack of yellow fever. There was a little outbreak of yellow fever during the time. A few months later we sent down another party to take some borings at the site of the Bohio dam, and every man that we sent down was laid up more or less with fever, and some of them I think have not fully recovered yet. So that as far as present conditions are concerned, that is, present sanitary conditions, I think the advantage is altogether in favor of Nicaragua.

Now, when the work is undertaken on either route the conditions will be less favorable, owing to the stirring up of the mud in the swamps and the soil; stirring up the soil anywhere will increase the sickness, beyond a doubt.

Senator HANNA. On the Nicaragua route?

Mr. NOBLE. On the Nicaragua route or anywhere else.

I wish to state that when extensive work was undertaken on the Croton watershed for the water supply of New York some years ago, a peculiarly healthful situation, one would think, there was a great deal of malaria, although it had not been known before.

I should think that as the unfavorable conditions developed, the aggravation would be greater perhaps in Nicaragua than in Panama, and what the total result would be under the new conditions I am not by any means certain, though I think the advantage would still be with Nicaragua.

Now, regarding the effect of the rainfall, the work on the eastern part of Nicaragua will have to be done, of course, under tremendous rainfall. That will very much affect the construction of the locks and the construction of the dam. It will affect to a less extent the immense amount of dredging in Nicaragua.

The work on the west side of Nicaragua, I think, will be undertaken under more favorable conditions than anywhere else on either route.

Now, as to the existing facilities for carrying on the work, or for commencing the work, they are altogether in favor of Panama. We have terminal harbors there and we have a railroad there, so that work can be commenced as soon as the necessary plant can be accumulated, and it is a country that is more or less settled.

The CHAIRMAN. On the subject of the plant, do you mean the installment of an entirely new plant?

Mr. NOBLE. Practically so. I do not regard the plant existing there as of much value. I do not think any American contractor would be willing to take it as a gift and use it. That would not apply to all of it, but it would to the greater part of it.

Senator HARRIS. Just at that point, do you think that that \$140,000 a mile is a reasonable price to pay for the Panama Railroad?

Mr. NOBLE. I should think so, inasmuch as it takes in its terminal facilities and rolling stock and everything of that sort.

Senator HARRIS. Terminal facilities are not of any special value as an aid to the construction of a canal?

Mr. NOBLE. They permit the landing of men and supplies and material.

Senator HARRIS. Well, so far as the limited points were concerned?

Senator HANNA. That is a part of the whole proposition. In order to do any work you have got to get the material there and you have got to land it and get it on the ground, and if you have not got the facilities you have got to make them.

Mr. NOBLE. That is the point exactly.

Senator HARRIS. The estimate of the cost of the railroad in the other case at \$75,000 a mile includes the amount necessary to make the railroad available and valuable?

Mr. NOBLE. Yes; that estimate is for the construction, of course, and independent of the harbor.

Senator HARRIS. Yes.

Mr. NOBLE. Harbor facilities already exist in the other case.

Senator HARRIS. In this case you provide for the construction of the harbor?

Mr. NOBLE. The Panama road is a very good railroad. The terminal facilities are good.

Senator HARRIS. Still, I understand your estimate of \$75,000 a mile for the Nicaragua line would be for the construction of a road which would do the same work.

Mr. NOBLE. Yes, it would, as far as the construction of the canal is concerned.

Senator HANNA. Right there, speaking of terminal facilities, the facilities for railroad purposes are all adequate to the Panama Railroad, while in building the railroad on the Nicaragua route you would have to construct those harbor facilities, piers, etc., as a part of the railroad, if it was only a railroad you were looking to.

Mr. NOBLE. Yes; we would not expect to provide quite as good terminal facilities.

Senator HANNA. No; but I am comparing the cost and value of the two railroads which Senator Harris raised the question about, one at \$75,000 a mile and the other at \$140,000 a mile.

Mr. NOBLE. Yes.

Senator HANNA. Now, in that \$140,000 a mile you have taken into account the terminal facilities, which the railroad company own and have constructed at an immense cost, which would have to be constructed before you could utilize your \$75,000-a-mile railroad in the other case?

Mr. NOBLE. I think that the \$75,000 a mile would provide for sufficient landings here for the construction of the canal.

Senator HANNA. But the construction of a harbor would be prerequisite?

Mr. NOBLE. That is provided for elsewhere in the estimates.

Senator HANNA. That is all I have to ask.

Mr. NOBLE. Now, it might be interesting to compare briefly the total amount of the principal classes of the work on the two routes. I do not think that has been done.

Two classes of work are greatly larger in Nicaragua than in Panama. Those two are dredging, which in Nicaragua is about 131,000,000 yards,

against 28,000,000 yards at Panama: and dry-earth excavation, which would be, like dredging, largely a matter of machine work, 47,000,000 yards at Nicaragua against 14,000,000 yards at Panama.

When we pass those items, then the amounts on the two routes are not so very greatly different.

Senator HARRIS. Just there, Mr. Noble, the fact of 57 per cent, I believe it is, of the work being dredging on the Nicaragua line is an advantage, is it not, in the way of economy and ease of handling?

Mr. NOBLE. Easier than other kinds—easier than the same number of yards to be done in some other way. The amount of rock excavation in Panama is 48,000,000 yards, against about 38,000,000 in Nicaragua, but in other respects the amounts do not differ very greatly.

Senator HANNA. That is principally in the harbor.

Mr. NOBLE. The rock excavation includes the summit cut and all other rock excavation above water. Out of 48,000,000 yards in Panama about 43,000,000 yards are concentrated in the so-called Culebra cut.

Senator HANNA. That is soft rock?

Mr. NOBLE. It is largely an indurated clay, so to speak, with dikes and seams of very hard rock interspersed through it. Now, the characteristic of the work in Panama, as I have just said, is in the matter of concentration. The same amount of work in Panama will be found in one or two localities as in a great many different localities in Nicaragua. The largest unit in Panama is 43,000,000 cubic yards of so-called rock in the Culebra cut, and the largest unit in Nicaragua is about 19,000,000 yards in the West Divide. The largest structure on the Panama line is the Bohio locks, which are about twice as large in cost and quantities as the largest structure in Nicaragua.

Senator HANNA. That is, in one structure?

Mr. NOBLE. That is in one structure; yes.

Senator HANNA. The aggregate structure of locks is larger in Nicaragua?

Mr. NOBLE. A very little larger. That is, perhaps, indicated by the concrete estimate—pretty nearly 3,760,000 cubic yards in Panama against 3,820,000 cubic yards in Nicaragua. The Pedro Miguel locks, next in size, are pretty nearly double the second in size in Nicaragua.

Those features affect the time required to complete the work. I do not think anybody on the Commission has estimated the time required to complete the Culebra cut at less than eight years. That period may possibly be shortened, but if means are developed by which the Culebra cut can be finished within eight years, it is reasonable to suppose that the largest unit in Nicaragua can be completed in four, because it is not half as large.

The CHAIRMAN. I believe the same time is computed for the construction of the Bohio dam?

Mr. NOBLE. I do not remember that exactly. I do not think the time is very greatly different. My impression is that our estimate was something less. The Frenchmen so stated in their estimate. I think our estimate is somewhat less.

Senator HANNA. Six years.

Mr. NOBLE. I think it is six years. The time required to build the Panama Canal will depend almost certainly upon the time required to do its largest unit, while there are so many units in Nicaragua of about the same magnitude, requiring about the same time, that it is not likely all could be finished at the same time. Some of them will lag, and for that reason more allowance ought to be made for delays. And

furthermore, there is so much more work in Nicaragua—the amount of dredging particularly is so much greater—that a larger working force will be required to do the work in the same time; and if we shorten the time, that will require a still larger labor force, and that may possibly become a very serious difficulty, so that we have allowed in our estimates a longer time for delays incident to the maintenance of a labor force; a larger time and a much larger proportion of time in Nicaragua than in Panama.

Senator HARRIS. And yet your ultimate conclusion as to time is that less time will be required to build a canal at Nicaragua than at Panama?

Mr. NOBLE. Yes.

The CHAIRMAN. Two years less?

Mr. NOBLE. Yes. I might say that the Commission were by no means unanimous about that. That is one of the hard questions we had to consider, but I have been unable to see how one could arrive at any very different conclusion. With the largest unit in Nicaragua less than half the dimensions of the largest unit in Panama, it seems to me that the comparative estimate of time is rational on the two routes; but that is a question on which the contingencies are very great. The difficulties of maintaining such a large labor force as that are very great, and we can not even foresee what the difficulties will be. It may be that it will depend after all on the relative healthfulness of the two routes, and that can not be predicted with any certainty.

Senator HARRIS. Just at that point, if I may be pardoned, no estimate was made by the Commission as to the sanitation of Panama, was there?

Mr. NOBLE. I think that was included in the lump sum which we provided for the sanitation of each of the two routes.

Senator HARRIS. Do you think that included the sanitation of the city of Panama?

Mr. NOBLE. Yes.

Senator HARRIS. It does not seem to have been so understood.

Mr. NOBLE. That was always my understanding of it. We always believed that it would be necessary to have absolute control of the government of the city of Panama. Now, as regards maintenance, the length of the artificial channel in Nicaragua is about 128 miles, where excavation, more or less, has to be made.

The CHAIRMAN. If you will allow me, does that refer to excavation in earth or excavation in water?

Mr. NOBLE. More or less excavation is required for 128 miles.

The CHAIRMAN. You mean that is excavation in earth and in water?

Mr. NOBLE. Yes; that includes the portion in the San Juan River and in Lake Nicaragua; while in Panama the distance of artificial channel is 36 miles. I think it ought to be very evident that the cost of maintaining, if other conditions are equal, would be in favor of the shorter route; that is, that the cost of maintaining 128 miles of artificial channel would be much more than the cost of maintaining 36 miles. At the same time it does not appear to me that it would be proportionately greater; the channels are not all of equal difficulty to maintain. The organization for general superintendence of maintenance and operation on the two routes will be very much the same, but the forces employed will be different.

The CHAIRMAN. In the 36 miles you mentioned do you include anything for dredging the ditch through Lake Bohio?

Mr. NOBLE. Whatever of that is required.

Senator HARRIS. Does that include any provision for policing the city of Panama, sanitary policing?

Mr. NOBLE. I am not sure that that matter came up for special consideration. If Panama and Colon should become great cities, of course it would not provide for it; but in my understanding, it would provide for everything under present conditions.

Senator HARRIS. As I understand, from reading the report, those provisions apply to the men employed in the construction and operation of the canal and along the line of the canal, but no estimate was given for anything outside of that.

Mr. NOBLE. It was intended to provide for the government and control of everything.

Senator HARRIS. Simply along the line of the canal.

Mr. NOBLE. My understanding is that it was intended to cover everything within a 10-mile strip, but if Panama and Colon become large cities they could not be included in that estimate.

Senator HARRIS. I would like to ask you about the water supply and the provisions for proper sewerage of the city of Panama. Was your attention attracted to that?

Mr. NOBLE. Suitable water supply could doubtless be had from the streams, but I do not think they have now any adequate water supply.

Senator HARRIS. They use simply cisterns?

Mr. NOBLE. I think so.

Senator HARRIS. But you think there are streams with sufficient elevation somewhere in the neighborhood that could be brought in?

Mr. NOBLE. Yes; I think so.

The CHAIRMAN. Did you come across the fact in your investigations that in 1898, I think it was, or within some reasonable period, that during an earthquake at Panama the wells in Panama and the vicinity had sunk?

Mr. NOBLE. I don't remember that; I may have heard it.

The CHAIRMAN. It is stated, I don't know whether it is true or not.

Mr. NOBLE. During one of the earthquakes the roadbed of the railroad had been shaken out of the line a bit and some spans of the bridge across the Chagres River had been moved to some little extent. That was the earthquake of 1881, if I am not mistaken.

Senator HANNA. I was asking you some questions with reference to the testimony furnished by Mr. Menocal. He was asked a question about the condition of the territory which would be covered by the Bohio dam, as to the permeable material. He testified as follows:

Mr. MENOCAL. My impression is that the whole valley is permeable, more or less—the bottom of the Chagres, the flood valley.

Senator HARRIS. You do not think it is covered by a sufficiently heavy and tight blanket; I believe that is the technical expression.

Mr. MENOCAL. That is the proper expression. I do not believe that it is sufficiently covered in that way. The description of the valley by the Commission shows that it is composed of gravel, sand, clay, and other permeable materials mixed in various proportions.

Senator HARRIS. The Commission's report also indicates that they recognize the existence of this permeable material.

Mr. MENOCAL. Yes; but even this top blanket, I think, is permeable as well, in the greater part of it, if not at all points.

Of course Mr. Menocal does not claim that he was there at any time with the Commission, and I do not know what his opportunities have been to make such a report. What is your judgment as to that, with reference to the whole valley being permeable?

Mr. NOBLE. The soil that appears at the surface is generally a clay;

if it were continuous down to bed rock it would make a very good foundation for an earth dam.

Senator HANNA. I am speaking about the seepage of water through the whole bottom of the basin, not as a foundation for a dam, but as a foundation for a reservoir.

Mr. NOBLE. If that soil extended down to bed-rock and earth dam would accomplish the entire purpose of maintaining the level of Lake Bohio, but the clay is underlaid by sand and gravel, the exact coarseness of which we do not know.

Senator HANNA. Is it in stratum?

Mr. NOBLE. It does not appear to lie in regular stratum; it is that want of regularity which you often see in the sand or gravel bars of a stream and was probably deposited in that way.

Senator HANNA. Do engineers know of any method of curing that condition in dams?

Mr. NOBLE. The principal thing to do is to extend a water-tight surface to anticipate possible seepage.

Senator HANNA. If you found any pockets of sand, you would treat them?

Mr. NOBLE. If we found any pockets of sand, they would be cut off by this diaphragm that we propose to sink, composed of caissons.

Senator HANNA. I am speaking about the interior surface of the dam. As I understood it, that was your question, Senator Harris, with reference to the bottom of the Chagres River Valley. You asked Mr. Menocal and he answered:

My impression is that the whole valley is permeable, more or less—the bottom of the Chagres, the flood valley.

Which I am treating now as the understanding that the valley, which would compose the basin of the Bohio dam, that the ground within the limits of that dam would be of permeable material. Of course, that is an open spot, the place that the river occupies.

Senator HARRIS. I was trying to arrive at whether or not this permeable material was connected in such a way with the waters of the lake so that the absolute head pressure would be felt clear down through there. I don't remember the question.

Senator HANNA. I could not understand it, and that is the reason I am asking Mr. Noble. Then you add, "You do not think it is covered by a sufficiently heavy tight blanket."

Senator HARRIS. The Commission uses the expression, "A blanket of clay," overlying this permeable material, I think it is.

Mr. NOBLE. Yes, sir.

Senator HARRIS. Which, if it is perfect, would cut off the head from having any effect upon this permeable material. I think it has been pretty well developed that the water in the lake will actually exert that pressure clear down through.

Senator HANNA. There was testimony given that if places of that kind were found, that there was a treatment provided by engineers by which those places could be filed up—stopped, plugged up.

Senator HARRIS. So as to cut off the water of the lake from this permeable material?

Senator HANNA. Yes.

Senator HARRIS. There is no mistake as to that.

Mr. NOBLE. That permeable material does exist under this clay blanket, and we have some reason to believe the clay blanket is not absolutely continuous. Now, methods have been proposed and used to some extent to solidify sand.

For example, some years ago a sewer excavation in Providence, I think, gave a great deal of trouble, and they sunk pipes and injected through them a mixture of cement and water, which solidified this material to such an extent they could proceed with open excavations without much trouble, but I am not aware that this process has ever been carried out to any large extent, and I don't know whether it has ever been carried out at all in a work of this kind. It is a thing that we had in mind as a possible means of stopping the material under the Bohio dam, under the diaphragm that we proposed to put in; if we should find any fissure there that would be beyond our depth we could sink pipes in it and inject a cement grout to cut off the seepage by forming with the sand and gravel a species of cement.

Senator HARRIS. That would be a point below the bed rock?

Mr. NOBLE. Below the general level of the bed rock.

Senator HARRIS. But there would be no way of treating pockets of permeable material; it would simply have to be in confined spots?

Mr. NOBLE. This grout will spread quite a little distance from the end of the pipes through which it is forced.

Senator HARRIS. Of course, I could see how that treatment in a fissure in a confined place between permanent walls would be effective, but to spread out to any extent it would not.

Mr. NOBLE. If there was a very large mass it would be very expensive; you would not be perfectly sure of getting a large mass filled. The tendency to hurry it would be dangerous, but in a small place I think it could be done.

Senator HANNA. Professor Haupt was a member of the last Commission?

Mr. NOBLE. Yes.

Senator HANNA. Did he accompany the Commission on their examinations on the isthmus?

Mr. NOBLE. No, sir.

Senator HANNA. What would be his source of knowledge with reference to it?

Mr. NOBLE. He spent quite a long period on the route of the Nicaragua Canal during the time of the Nicaragua Canal Commission, and that Commission also visited Panama and made some examination, but I do not know how extensive.

The CHAIRMAN. Do you base your conclusions about the practicability of building a stone dam at Bohio upon the borings?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. Mr. Haupt had access to them?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. He knew all the figures.

Mr. NOBLE. Yes, sir.

The CHAIRMAN. You were not there to superintend the borings?

Mr. NOBLE. No, sir.

The CHAIRMAN. You had to take the reports of the subengineers?

Mr. NOBLE. We had to go by the record.

The CHAIRMAN. Yes; and he went by the record.

Senator HANNA. I was not directing my question to that at all. I was going to ask Mr. Noble with reference to the silt in the Chagres River. Were you up the Chagres River?

Mr. NOBLE. Yes, sir.

Senator HANNA. Testimony has been furnished here, I believe, by Mr. Haupt and Mr. Menocal that the silt carried in sediment by the Chagres River would be a very dangerous factor in filling up the Bohio

basin or lake and one of them stated that he believed it would fill up in twenty years, so that it would be absolutely full of silt. From your examinations of the Chagres River——

The CHAIRMAN. That is, so as to prevent navigation.

Senator HANNA. Yes; to interfere with navigation. It could be dredged out.

Mr. NOBLE. The formation of Lake Bohio will create slack water pretty nearly up to the dam, and the water coming over it would deposit its sediment in the first still water it reached. It would be a very long time before the valley would fill down to the line of the canal.

Senator HANNA. Did you discover anything in the nature of banks that would lead you to believe that the abrasion would be very rapid, or that the silt would be of an unusual quantity for the river?

Mr. NOBLE. I do not think that the amount of silt carried by the Chagres, as a whole, is very great. It must carry a large percentage for short periods during the very great floods, but when we saw it it was a pure-water stream. It is a mountain stream, practically.

The CHAIRMAN. Do you recollect the place on the Chagres River where spur tracks had been run in for the purpose of getting gravel to ballast the railroad out of those washings?

Mr. NOBLE. I heard of it.

The CHAIRMAN. You don't remember seeing that?

Mr. NOBLE. I doubt if they were there during our visit. I did not see them anyway.

Senator HANNA. In reference to the large cut, do you anticipate any physical or engineering difficulties in the completion of that cut?

Mr. NOBLE. I do not. I anticipate nothing very serious.

Senator HANNA. Nor, as you said before, in the construction of the Bohio dam?

Mr. NOBLE. No, sir.

The CHAIRMAN. Will you state why it is necessary to put in a retaining wall on both sides of the canal there for about 7 miles?

Mr. NOBLE. That clayey material disintegrates somewhat when it is exposed to the air, and probably, although to a less extent, when it is exposed to the water. It is interspersed with seams of rock, both vertical and horizontal, which would be dangerous for ships, and particularly so if the clay should slowly wash away and leave them projecting. Revetment walls are therefore necessary.

The CHAIRMAN. To meet the possible danger of such slides, you put in that wall?

Mr. NOBLE. To meet the slight deterioration of the clay and also the exposing of the hard surface of the rock to ships.

Senator HARRIS. The rock dikes could be trimmed off so as to be smooth as a masonry wall?

Mr. NOBLE. A slope in the water, I think, is extremely dangerous to a ship if there is any hard material. We had experience with such slopes at the Sault Ste. Marie Canal.

Senator HANNA. I remember that very well. It was a great place to break wheels.

Mr. NOBLE. Yes, and to knock a hole in a ship. It was a common occurrence.

Senator HARRIS. This retaining wall is a perfectly smooth surface?

Mr. NOBLE. Yes, and vertical.

Senator HARRIS. And could not the bedrock be trimmed off so as to form practically the same kind of a wall where there is rock?

Mr. NOBLE. If the rock is hard rock it will maintain itself without

disintegration, and that is what the project provides for when such rock is met, but in the Culebra cut the so-called rock for the greater part is an indurated clay that will gradually dissolve away.

Senator HARRIS. There would be a melting down?

Mr. NOBLE. Yes; leaving those points of rock exposed.

Senator HANNA. Leaving the weather points exposed?

Mr. NOBLE. Yes, sir.

Senator HARRIS. You think that melting down—of course, the appropriation is about \$9,000,000 for this retaining wall?

Mr. NOBLE. I don't remember now what that costs.

Senator HARRIS. So that evidently the Commission contemplated a pretty serious risk from this gradual melting down of the clay and sliding into the canal?

Mr. NOBLE. The Commission provided at the outset for the protection of the banks of the canal wherever any material other than earth was met, provided for making the sides vertical, and if the material could not be depended on to remain vertical then to have a retaining wall. We provided for that very largely in Nicaragua in places where the rock is classed as soft rock, and for the same reason, to make a perfectly straight and smooth channel for vessels and prevent slow deterioration of the sides of the channel.

Senator HANNA. One witness testified before the committee that the material from which this cut was being constructed was about the worst sort of thing that could be found anywhere above or underneath the ground, and that it was constantly sliding. That was the testimony, I believe, of Mr. Plume.

The CHAIRMAN. It was at the top of the hill.

Senator HANNA. I was just going to ask Mr. Noble about that. Mr. Plume was at one time the trackmaster of the Panama Railroad. Did you ever meet him?

Mr. NOBLE. No, sir.

The CHAIRMAN. He had gone away from there years before that.

Senator HANNA. He testified that he was there from 1883 to 1888, and during that time when the work was being done by the old company they had some difficulties in the Culebra cut.

Mr. NOBLE. Very great.

Senator HANNA. About the sliding.

Mr. NOBLE. Yes, sir.

Senator HANNA. That was with surface materials?

Mr. NOBLE. Yes.

The CHAIRMAN. From sliding?

Mr. NOBLE. Yes.

Senator HANNA. In their recent workings have they encountered any difficulty of that kind to any extent?

Mr. NOBLE. I saw traces of a recent small slide in this material. It was not important, but the material at the top is not yet in a state of perfect stability; the sides of the cut farther down show that the material there is stable.

Senator HANNA. So that there is nothing about the conditions existing there to make any serious trouble in the completion of the work?

Mr. NOBLE. No serious trouble, I think, at all.

Senator HARRIS. Is that increased apparent stability due to a change in the soil or owing to the fact that that soil near the surface has been weathered and subjected more to the influence of the weather?

Mr. NOBLE. It looks like a very different material and I think that it is. I went down in one of the test shafts and examined the material

very carefully. The material did not seem to be changed at the face of the shaft, and I should judge that the angles were as sharp as when left there, but as soon as that material was brought to the surface and dried and then placed in water it would dissolve.

Senator HARRIS. That was by the combined action of the drying and the application of the water?

Mr. NOBLE. Without doubt, because the simple application to water did not seem to affect it in any visible degree.

Senator HANNA. I understand that you found the same class of material along the Nicaragua route? I think Mr. Haines did.

Mr. NOBLE. No; I don't think so.

Senator HANNA. On the sides of the cut above where the wall would be, when exposed to the air in the modern workings, was there any disintegration there of this clayey substance?

Mr. NOBLE. Yes; it showed somewhat the same tendency to crumble. If you expose a lump of this clay to the air, it will go to pieces gradually.

The CHAIRMAN. I will ask you, as an engineer, whether material in any cut is not more liable to become disintegrated when it is exposed to the alternate action of heat and cold or wet and dry seasons, and whether that disintegration is not usually more rapid where it is one only of these circumstances, such as water?

Mr. NOBLE. I think that is so. Of course, in our northern climate the frost is the most destructive agent probably that we have in the sides of cuts.

Senator KITTREDGE. What do you say about the value of the property at which the Panama Company proposes to sell?

Mr. NOBLE. I think the estimate placed upon that by the Commission is fair.

Senator HANNA. Are you familiar with what is embraced in what they have to sell on the Isthmus?

Mr. NOBLE. I think so.

Senator HANNA. Is it a fact that they own a very large amount of land on either side of the proposed canal?

Mr. NOBLE. Yes, sir.

Senator HANNA. Do you know what proportion of the land along the route they own and what percentage the railroad company own?

Mr. NOBLE. I could not give you the exact percentage, but it is the greater part of it.

The CHAIRMAN. That is fixed in the concession.

Senator HANNA. Yes, of course it is; but I want to know how much they own in fee.

The CHAIRMAN. I did not know that they owned anything.

Senator HANNA. Oh, yes, they do. How much do they own? The principal part of the area they own in fee.

Mr. NOBLE. Yes.

Senator HANNA. Do you know whether that is the case to any extent along the Nicaragua route?

Mr. NOBLE. No, I do not think it is the case at all.

Senator HANNA. Does the Maritime Canal Company own any land in fee along that route?

Mr. NOBLE. I think they do on the area through the western portion.

The CHAIRMAN. When lawyers speak of fee, they mean a perfect title, but this was a lease in Panama.

Mr. NOBLE. I understand that they own this land in Panama.

Senator HANNA. They own it in fee.

The CHAIRMAN. I do not so read the concessions.

Senator HARRIS. You are alluding to property purchased from private individuals.

Senator HANNA. I do not know from whom they purchased it, but they purchased it and have the fee, and I will furnish testimony on that subject. I am pretty well informed as to Panama. I was inquiring as to whether Mr. Noble knew anything about the concessions of ownership along the proposed 10-mile strip in Nicaragua.

Mr. NOBLE. I do not think the Maritime Canal Company own any land in Nicaragua except in the western portion.

Senator KITTREDGE. That subject was investigated by Senator Pasco.

Mr. NOBLE. I think so; the Senator could answer the question more definitely.

Senator HANNA. With reference to the operations of the canal, you said this morning—I think you said—that the expense would be about in proportion to the relative distance.

Mr. NOBLE. No; I said it would not be quite, because the general management would be about the same in both cases. The length of restricted channel in Nicaragua is between three and four times the length of the restricted channel in Panama and the length of the entire route is almost exactly four times as much, and the cost of the working parties for maintenance would be approximately proportioned to length.

Senator HANNA. In arriving at your estimate in the additional cost of \$1,300,000 in operation of Nicaragua over the Panama route, you took all those things into consideration?

Mr. NOBLE. Yes, we took in all the force for maintenance, and operation, superintendents, engineers, machinists, hospitals, and police force, and so forth, and tried to arrange an organization on the same basis on both routes.

Senator HANNA. If there is any danger of accident in the operation of the canalized portion of the route, it would be in proportion to its length, the magnitude of expense would be greater on the longer route than on the shorter.

Mr. NOBLE. Pretty nearly in proportion as regards accidents.

Senator HARRIS. Just at that point, is there not another element determining the possibility of accidents; that is, the magnitude of the work. For example, a lock with a double lift, or a longer lock, would have increased chances of accidents and so would the magnitude of the work generally.

Mr. NOBLE. The accident most likely to occur at a lock is the striking of the gate by a ship. Such an accident is likely to prove destructive to the gate—to have serious consequences for the ship. The likelihood of such an accident depends little on the magnitude of the lock or gate.

Senator HARRIS. There are accidents to machinery in proportion, and the greater the lift the more powerful the machinery that will be necessary.

Mr. NOBLE. Yes, it must be more powerful; but the increased chances of accidents will be provided for in that way—by making the machinery heavier.

Senator HANNA. You have had experience in this country in the largest locks in this country. The Sault Ste. Marie, the last lock, is four times as large as the first one. Have you found any difficulty in the last lock by increasing your machinery?

Mr. NOBLE. I did not have any difficulty of that kind with the lock built under my charge. There has been a great deal of difficulty in

operating the machinery of the last lock built, but this is on account of its faulty design, and not on account of its greater magnitude.

The CHAIRMAN. Who were your coadjutors?

Mr. NOBLE. I was in local charge at first under General Poe and afterward General Weitzel, of the Engineer Corps of the Army. That was a Government work.

The CHAIRMAN. What is the size of the last lock?

Mr. NOBLE. Eight hundred feet long and 100 feet wide, 21 feet draft, and about 20 feet lift.

The CHAIRMAN. On page 83 of the report of the Isthmian Canal Commission I find the following statement:

The liquidator found himself laboring under special legal difficulties from which he obtained relief by the special law of the French Chambers, dated July 1, 1893. (See Appendix KK.) He finally secured the organization of a new company on the 20th of October, 1894, with a capital stock of 650,000 shares of 100 francs each. Six hundred thousand shares had been subscribed to be paid for in cash, and 50,000 shares were given as full-paid stock to the Colombian Government in compliance with the terms of the extension of the concession, dated December 26, 1890.

Thus the cash capital of the company was 60,000,000 francs, or \$11,640,000, a sum deemed sufficient for the provisional operations contemplated. The scandals connected with the failure of the old company, which had led to the prosecution and conviction of De Lesseps and other prominent persons, had made it difficult to secure even that amount. Suits had been brought against certain loan associations, administrators, contractors, and others who were supposed to have unduly profited by the extravagant management of the old company.

A series of compromises were made with these persons, by which it was agreed that they should subscribe for stock in the new company on condition that the suits should be dropped. Whatever amount remained to make up the 60,000,000 francs, after deducting the sums thus obtained and those to be obtained by public subscription, was to be subscribed by the liquidator.

What I want to get at is the evidence upon which the Commission based that statement.

Mr. NOBLE. I do not know what written evidence the committee that had that particular matter in charge had. That was out of my special field.

The CHAIRMAN. But you were aware of the fact that that statement was made in the report?

Mr. NOBLE. Yes, I was aware of that, and that statement was made to us by the Panama people while we were in Paris.

The CHAIRMAN. Have you any means of giving to this committee information that will help them to find out who these individuals were that were impressed into taking stock in this new company?

Mr. NOBLE. My impression is that they are named on the next page, page 84.

The CHAIRMAN. No, I do not think so. I find there the following statement:

Stock was subscribed as follows, viz:

	Francs.
Eiffel	10, 000, 000
Credit Lyonnais	4, 000, 000
Societe Generale	4, 000, 000
Credit Industriel et Commercial	2, 000, 000
Administrators of the old company	7, 885, 000
Artique, Sonderegger & Co	2, 200, 000
Baratoux, Lettellier & Co	2, 200, 000
Jacob heirs	750, 000
Coubreux, Hersent & Co	500, 000
Various persons to the number of sixty, who had profited by syndicates created by the old company	3, 285, 700
Hugo Oberndorffer	3, 800, 000
Public subscription	3, 484, 300
The liquidator	15, 895, 000
Total	60, 000, 000

Do you understand all those men were in that category that we have referred to; that is to say, men who had been engaged in litigations with the old company or against whom the old company had demands and that they were compromised by the taking of stock in the new company?

Mr. NOBLE. That is my understanding. I may be wrong in the case of some of those parties.

The CHAIRMAN. How about Eiffel?

Mr. NOBLE. I think Eiffel is one of those people.

The CHAIRMAN. The old company had a demand against Eiffel in consequence of some conduct that he had been guilty of in connection with the old company's affairs.

Mr. NOBLE. As I understand it, there were suits brought against him.

The CHAIRMAN. Eiffel and others, in this list that I have read, were drawn into the new company because of the wrongs done to the old company and that was done by way of compromising their liabilities.

Mr. NOBLE. There were civil suits brought against them, I understand. I don't know anything about the merits of the suits. They were compromised by their taking stock.

The CHAIRMAN. Then we are dealing with the men who robbed the old company?

Mr. NOBLE. I don't want to put any interpretation on that at all.

The CHAIRMAN. I mean who are understood to have robbed the old company?

Mr. NOBLE. I can not answer that.

The CHAIRMAN. Well, I supposed that you ascertained that \$250,000,000 had actually been expended in some way or other in this canal enterprise?

Mr. NOBLE. That was the statement.

The CHAIRMAN. And of course that has been paid in by the old stockholders and bondholders?

Mr. NOBLE. Yes, sir.

The CHAIRMAN. The Government of France did not subscribe any of it?

Mr. NOBLE. None at all.

The CHAIRMAN. So that the money was derived from those channels, and when the crash came the Government took up the prosecution of these cases, I believe, under that special act of the assembly that they passed for the purpose.

Mr. NOBLE. I don't know about that.

The CHAIRMAN. Well, at all events, the prosecution was taken up and these men were being followed up, and they compromised by taking stock in the new company, and they are the men that we are dealing with now.

Mr. NOBLE. That is the way we understand it, that they compromised the suits.

Senator HANNA. That was a matter that did not enter into your prerogatives as an engineer?

Mr. NOBLE. No, sir.

Senator HANNA. Now, I want to ask you another question as a business proposition. The report of the Commission estimates the cost for the completion of the Panama Canal at \$145,233,000, and adding to that \$40,000,000 more, it would bring it up to \$184,000,000. What was estimated as the cost of Nicaragua?

Mr. NOBLE. \$189,664,000.

Senator HANNA. Now, what would be the chances of the estimate being over or under as respects the two routes?

Mr. NOBLE. In my opinion, the comparison by these estimates is a fair one.

Senator HANNA. Now, you said the difference between the cost of maintenance and operation is \$1,300,000 in favor of Panama, which, capitalized at the rate the Government would pay for money—2 per cent—would make a difference equivalent to the capitalization of \$65,000,000. As a business proposition, would not that be a fair credit on the capitalization of the Panama Canal?

Mr. NOBLE. I am not sure about that. That method of estimating leads to queer results. If the Government borrowed the money for nothing, the capitalization on that basis would be an infinite amount, as a mathematical deduction which is but expenses, might be met by increased tolls or by annual appropriations without borrowing.

Senator HANNA. The Government would be out that much difference every year in the cost of operation, \$1,300,000.

Mr. NOBLE. Yes, sir; if the canal were free.

Senator HANNA. If it selected the Nicaragua route; therefore, it would be an expenditure in excess of what would be necessary on the Panama canal. I am just figuring it as an investment from a business man's standpoint, and if you capitalized that amount it would equal \$65,000,000.

Mr. NOBLE. If the expenses were paid by tolls, then it would not cost the United States anything.

Senator HANNA. It would cost the vessels something.

Mr. NOBLE. It would cost the vessels, of course.

Senator HANNA. It would be that much as an embargo on the boats from that standpoint?

Mr. NOBLE. It would be, certainly, an annual cost as compared to the other route.

Senator HANNA. Well, then, taking the whole proposition, considering all the questions that we have been seeking answers to here for information, you are free in your belief that the Panama canal is a better proposition for the United States?

Mr. NOBLE. I think it is the better proposition.

The CHAIRMAN. In that estimate do you include tolls to be collected from sailing ships?

Mr. NOBLE. We have not considered the question in relation to sailing ships as of having any special weight.

The CHAIRMAN. Why?

Mr. NOBLE. Because we think the sailing ship is a matter of the past, practically.

The CHAIRMAN. You do not think there are going to be any more sailing ships?

Mr. NOBLE. I think the tonnage of sailing ships will continue to decrease from year to year.

The CHAIRMAN. Well, do you know of any reason that you can assign for that belief?

Mr. NOBLE. That seems to be the tendency of commercial development.

The CHAIRMAN. Well, if it is the tendency and there is an increase—an apparent increase—in the proportion of steam vessels, is there not also an increase in the cost of fuel for steam vessels?

Mr. NOBLE. I do not know how that is, as a matter of fact. I hardly think there is.

Senator HANNA. I can answer that.

The CHAIRMAN. You have not looked into that?

Mr. NOBLE. No, sir.

The CHAIRMAN. Where a vessel has to transport its fuel to a certain point so as to maintain its journeys backward and forward, from ocean to ocean, does not that add considerably to the expense of that vessel?

Mr. NOBLE. No doubt about that.

The CHAIRMAN. Will not that expense increase as to the commerce of the world in proportion to the number of steamships that are built?

Mr. NOBLE. With the price remaining the same, it will, certainly.

The CHAIRMAN. Do you really contemplate the time when the world can afford to give up its sailing ships to steam vessels, whose expenses must be increased by reason of the transportation of coal to different stations to supply them on their voyages?

Mr. NOBLE. I have not contemplated the time when that will occur, but I think the tendency is in that direction.

The CHAIRMAN. But at all events, in the projection of the Panama Canal, you have dropped out entirely the question of sailing vessels?

Mr. NOBLE. In the comparison of the two canals we have given no weight to that feature.

The CHAIRMAN. You could not give much weight in favor of Panama in consequence of the doldrums?

Mr. NOBLE. The Nicaragua route is better for sailing vessels.

The CHAIRMAN. There was 543 miles in addition to the length of coast line by going through Panama to what it would be to go through the Nicaragua and come out at Brito; I think it is 543 miles. We have been speaking a great deal about the advantages of continuous coastwise trade. Would you not think that would be a serious incumbrance on the coastwise trade to add 543 miles to it?

Mr. NOBLE. Some of the coastwise trade would be served better by Panama than by Nicaragua. All of the South American coastwise trade would.

The CHAIRMAN. I am speaking about the North American coastwise trade.

Mr. NOBLE. That would be decided——

The CHAIRMAN. Five hundred and forty-three miles to a sailing ship would be a good distance.

Mr. NOBLE. It would require a considerable time for a sailing ship if Panama Bay were a part of the 543 miles.

The CHAIRMAN. That relates to the coastwise trade on that side. On this side the sailing distance is greater from New Orleans to Colon than to Greytown, is it not? I will ask you what is the difference in the distance between Nicaragua and Colon to a ship starting from New Orleans?

Mr. NOBLE. Approximately, 240 miles.

The CHAIRMAN. Then, that would be nearly 800 miles on the voyage for the coastwise line—in line of coastwise trade. If they went through Panama instead of going through Nicaragua, that would be about the difference?

Mr. NOBLE. Yes, sir; on the basis of the distances mentioned.

The CHAIRMAN. Well, in your estimate, now, of the comparative cost of maintenance you would feel disposed to balance it up against the income, would you not? If there was a greater income from the Nicaragua route than from the Panama route, you would think that ought to cover, to the extent of its value, the question of maintenance and the keeping of the canal in order?

Mr. NOBLE. I think that if you could prove that the Nicaragua Canal would serve the interest of the country better than the other that ought to be given weight.

The CHAIRMAN. Suppose that the coastwise trade of the United States, on both coasts, average about 57 per cent of sailing vessels, don't you think that the tonnage that would then pass through the Nicaragua Canal would add materially to the income of that canal?

Mr. NOBLE. I think that kind of commerce would diminish steadily; that the sailing vessel would be used less and less for the coasting trade even. That is not a matter that I have any special information on, but that is my personal belief.

The CHAIRMAN. Suppose you are mistaken, suppose that it holds its own at such a per cent that 57 per cent, as it is now, then you would get a proportion, at least, of sailing vessels going through the Nicaraguan Canal that you would not get to Panama?

Mr. NOBLE. I think so.

The CHAIRMAN. And then the tonnage, the charges for towing through, the tolls upon the tonnage the sailing ships, would have a very considerable effect upon the question of maintenance, and would it not balance up the account of maintenance?

Mr. NOBLE. Under that hypothesis, that 57 per cent would remain constant, it would enter largely on that side of the account.

Senator HANNA. If the hypothesis for those figures is correct, that 57 per cent of the coastwise trade is done by sailing vessels, that takes into account all of the coastwise trade on the Atlantic, and that never goes near the isthmus, and that is a majority of the coastwise trade done by sailing vessels along the Atlantic coast, and I would want to have those figures and produce them. The proportion of the tonnage plying between New York and ports along the Atlantic coast and to the Pacific ports of the United States would be a very small fraction of the 57 per cent of the tonnage, and that 57 per cent would not go through the isthmus in sailing vessels.

The CHAIRMAN. I beg to differ with your conclusion on that. I think that we will increase it from 75 to 80 per cent because of the coal mines in Alabama.

Senator HANNA. With reference to the advantage to the sailing vessels using the Nicaragua route as against the Panama route on account of the doldrums in Panama Bay, the distance from Greytown to Bohio is 187 miles, I believe, or 189 miles. The distance from Colon to Panama is about 50 miles. Now, of course, a sailing vessel passing through the Nicaragua Canal would have to be towed the entire distance.

Mr. NOBLE. I think so.

Senator HANNA. And towed out to sea clear of any harbor arrangement. Therefore a sailing vessel towed through Panama Canal the same distance would take her out to sea?

Mr. NOBLE. I am not sure about that. My impression is it would not take her out to the region of reliable winds.

Senator HANNA. It would take her outside of the Bay of Panama?

Mr. NOBLE. Yes.

The CHAIRMAN. I have got the charts here to show that it is between 500 and 600 miles out to the sailing lines on the Bay of Panama, and will have a witness here from the Hydrographic Office.

The committee then (at 3.55 p. m.) adjourned until Saturday, February 15, 1902, at 10 o'clock a. m.

STATEMENT

OF

WILLIAM H. BURR

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Friday, February 21, 1902.*

The committee met at 10.30 a. m.

Present, Senators Morgan (chairman), Hanna, and Foster, of Louisiana.

Also Senators Hawley, Kittredge, and Millard, members of the committee.

Mr. William H. Burr appeared and was duly sworn by the chairman.

STATEMENT OF WILLIAM H. BURR.

The CHAIRMAN. Mr. Burr, you have once been examined before this committee, in May, 1900. Have you examined your statement made on that occasion?

Mr. BURR. I have looked it over only this morning, but rather hastily.

The CHAIRMAN. Have you any changes to make in any statement you made at that time?

Mr. BURR. I have no changes to make, except so far as required by the developments of subsequent examinations.

The CHAIRMAN. I mean changes in the facts.

Mr. BURR. No changes in facts.

The CHAIRMAN. You have changed your conclusions about the availability of the two routes, but you see no occasion to change any fact you have stated there?

Mr. BURR. I see no occasion to change any facts I stated then.

The former statement of Mr. Burr, above referred to, is as follows:

FORMER STATEMENT OF WILLIAM H. BURR.

Mr. BURR. I think, Mr. Chairman, a little of this difficulty which confronts you arises from the fact that perhaps it is difficult for one not engaged in engineering matters to realize the amount of work and study which has to be done in connection with such a project before the final dimensions of the matter can be reached.

The cross section of prism and length of locks are only two elements in the problem. The alignment of the canal has not yet been determined, except in some portions. The matter of exploration, as the Admiral has just stated, is only partially complete. We can not now recommend the location of the entire line. Those are matters which depend on detailed surveys now in progress and which can not be finished for some months yet, although we have a force at work, which was largely increased after we reached Nicaragua.

The determination of the best canal prism, to return to that point, is a very complicated question, and probably when we decide upon it many engineers, even, will criticise the decision, although that will not disturb us. The size of a canal prism will depend upon the maximum size of ship which is to navigate it, and that is not by any means exactly determinable. It will depend also in places upon the curvature of the line, and that has not yet been determined, because we can not locate the line at all points as yet. Those are two questions only. There is another very important question connected with the prism, after having decided upon the maximum size of ships which will navigate the canal, and that is its cross section relatively to that of the ship which is to navigate it, because the speed and cost of running a ship through a limited waterway depends upon the relative dimensions of cross section of ship and cross section of prism.

The size of the lock is also an important matter and one that ought not to be decided in haste. The lock is the most expensive single device of the entire construction, saving possibly the dam, the site of which is not yet determined. It is a question, perhaps, whether the locks should be located as twin locks or as single locks, although probably some members of the Commission have settled that matter in their own minds. Then, again, the size of ships must settle the size of a lock, and who can predict the size of the ship which will pass through this canal ten years hence? We must consider that, although we can not wait for a mathematical demonstration upon that point.

Those features, Mr. Chairman, all have to have very careful consideration, and we have not yet had time to give them the attention which they deserve.

The CHAIRMAN. Those are mere skeleton statements, and they are very satisfactory statements.

Mr. BURR. The details are numerous and complicated, I can assure you, and are beyond consideration in a short time.

The CHAIRMAN. Have you the data now upon which to make those calculations?

Mr. BURR. No; we have not. We have some data.

The CHAIRMAN. What data are wanting?

Mr. BURR. We have not yet sufficient data to enable us even approximately to determine the size of ships which will pass through this canal.

The CHAIRMAN. There are no data on that subject. That is all conjecture.

Mr. BURR. Still, we have to use that conjecture.

The CHAIRMAN. Take the biggest ship that is afloat now to-day, the *Oceanic*. Is that big enough to suit your views?

Mr. BURR. There is another one planned still larger than the *Oceanic* already.

The CHAIRMAN. Do you expect to make a canal that will carry Noah's ark or something like that through it?

Mr. BURR. No; probably not. We hope there will be no occasion for Noah's ark.

The CHAIRMAN. Will we not have to accommodate our action, whatever it may be, to the facts that exist, and not build it for conjectural purposes that may never be realized?

Mr. BURR. We must do that, of course. We must use our judgment, but it is a matter of judgment that can not be reached off hand.

The CHAIRMAN. You have mentioned one, the size of the ships in the future. What are the next data in which you are wanting?

Mr. BURR. The most important part of the data are those portions which our parties in the field will give us when their work is complete.

The CHAIRMAN. What are they?

Mr. BURR. They are the lines and levels which are requisite to determine the best location of the route.

The CHAIRMAN. Have not all these lines and levels yet been run along that canal, after these many years of survey.

Mr. BURR. No, sir; far from it. I wish they were. We should have reported before this time if they had been. We have eight or nine parties in the field now, I think.

The CHAIRMAN. Now, Mr. Burr we have had two difficulties; one is ships, and the other is want of lines and levels to determine what the curvature ought to be to accommodate ships of the very largest size, and so on. Is there any other?

Mr. BURR. We still lack sufficient data to determine the lock sites and dam sites. Those are very important elements, and the data are to be obtained partially by instrumental field examinations and partly by boring.

The CHAIRMAN. That is three. Is there any other?

Mr. BURR. Those may be considered the main classes of facts which we still lack.

The CHAIRMAN. Have those questions which you have put any real significance as bearing upon the proposition whether the building of a canal through Nicaragua and Costa Rica is feasible and practicable?

Mr. BURR. I should like to state just at that point, Mr. Chairman, simply as one engineer member of the Commission, what my judgment is as to the feasibility of those two lines, because, although it has been brought out and I concur fully in what has been said, it seems to me it has not been set forth quite as clearly as might be. So far as our examinations have gone, and so far as the examinations of others that have preceded us have gone, whether of the Nicaragua Canal Commission, of which Admiral Walker was the president, or of the French engineers, it seems to me that either line is entirely feasible as an engineering construction. There are difficulties in connection with both, but they are not difficulties which are greater or more formidable than those which are ordinarily encountered in engineering enterprises of great magnitude.

They may be overcome, and overcome by plans which have already been more or less considered, and which will be perfected when the report of this Commission is made. I know of nothing, so far as the examinations that have been made are concerned, which would make the protection of the Colon end of the Panama Canal infeasible. It is perfectly practicable and feasible, a mere question of money and construction. That is all. The water supplies are of the same character, and the difficulties attending the selection of the dam sites, so far as we can at present see them, seem to be quite similar. Both lines, in my judgment, are entirely feasible. One may be more feasible than the other, but that is still an open question.

The CHAIRMAN. Now, Mr. Burr, I am gratified that you have departed from the question and have made a comparison between the two routes, which my question did not at all suggest. I am gratified you have done so because it gives us your views about that subject; and I am

gratified that you say, at least as to the Nicaragua Canal, that it is perfectly feasible. Taking that as a fact granted, that is the legislative basis upon which we are trying to proceed, and that is all of it. As to the best line, whether it is the high level of Nicaragua or the intermediate or the low level, that is a question that I suppose it may take some time to determine. So as to the curvatures that are necessary in order to accommodate ships of a size as great as the greatest that exist, or that may exist. That is another matter. It does not at all affect the feasibility of the canal. It is a question of detail, a question of administration, a question of arrangement; and everybody understands that all of these questions will have to change their nature or their characteristics as developments are made.

The engineers who construct this canal will find new facts every day about it. They will have to accommodate their former opinions to these new facts, and perhaps adopt new ones. We are on the question as to the feasibility and practicability of the canal. Is there any fact wanting now to enable this Commission to determine upon the proposition? Is the Nicaragua Canal feasible and practicable? That is what I want.

Mr. BURR. It has already been said by the president of the Commission that both are feasible and practicable, as I understood him; but as to which is most feasible and practicable is yet an open question.

The CHAIRMAN. We do not expect any engineers to settle that for Congress.

Senator HANNA. Mr. Burr, you are a member of the Isthmian Canal Commission?

Mr. BURR. I am.

Senator HANNA. Did you accompany the Commission on its visit to Panama and Nicaragua?

Mr. BURR. I did.

Senator HANNA. How long were you there?

Mr. BURR. We were gone from New York City almost exactly three months.

Senator HANNA. You went over both the Nicaragua route and the Panama route?

Mr. BURR. I went over both routes and visited all the points, and made all the examinations which the Commission made on that trip, except that one member of the Commission went to the Isthmus of Darien. I did not go there. Mr. Morison only made that trip.

Senator HAWLEY. Was that three years ago?

Mr. BURR. No; that was two years ago.

Senator HAWLEY. Were you in the Walker Commission?

Mr. BURR. The first so-called Walker Commission was the Nicaragua Commission. I was not a member of that.

Senator HANNA. Were you a member of any previous commission or surveying party?

Mr. BURR. Not in connection with this isthmian canal business?

Senator HANNA. You signed the report of the Commission that they made to Congress?

Mr. BURR. I did.

Senator HANNA. In that report it is stated that owing to the unreasonable price fixed by the Panama Canal Company for the sale of their property, you under those conditions recommended the Nicaragua route. If the price had been as it is now, \$40,000,000, what would have been your judgment about it at that time?

Mr. BURR. I should have been in favor of the Panama route. I was then in favor of it, except for the unreasonable price put upon it.

Senator HANNA. Now, Professor, in your own way, it will expedite matters if you will state to us the reasons that led you to that conclusion, as briefly as you please.

Mr. BURR. The reasons leading to that conclusion were partially based upon the information which the Commission secured in Paris, about four or five months prior to our visit to Nicaragua and Panama. The information then secured is a part, and a very important part, of the complete data on which my conclusions, and I presume the conclusions of all the members of the Commission, were based.

The first part of our examination in Central America was devoted to the Nicaragua route. That line is, in the first place, much longer than the Panama line. It involves a larger amount of work to be done, and the elevation of the summit level is a little higher than that of the Panama route. There is necessarily much more curvature on the Nicaragua route than on the Panama.

There are more locks, which are both costly to build and to maintain, and they are objectionable. They are necessary, but still they have their objections, and the fewer there are of such objections the more favorable the route will be as to that one feature.

It has been my judgment, although not the judgment of all members of the Commission, that the harbor question is less favorable at Nicaragua than at Panama, although that is not such a very serious matter, because it is perfectly feasible to construct and maintain harbors both at Greytown and Brito, on the Nicaragua route.

The regulation of the level of Lake Nicaragua involves more difficulty, and is not so simple as the regulation of the summit level of the Panama route.

On the other hand, there is one feature on the Panama route which involves more difficulty in construction than the corresponding feature of the Nicaragua route. I refer to the great dam at Bohio, which is an absolutely essential part of the Panama construction. Its maximum depth of foundation is much greater for such a matter than on the Nicaragua route.

The greatest depth of foundation below water at Bohio, on the location selected by the Commission for its estimates and plans, is about 128 feet; whereas at Conchuda, on the Nicaragua line, the corresponding depth is about 82 or 83 feet.

The depth of 128 feet is greater than has yet been reached by the pneumatic process of constructing foundations, the process ordinarily used in such work; but there are methods of reaching that great depth which are entirely feasible. The physical features of the situation are such at Bohio that I am perfectly confident, from my own experience in engineering work, the foundations of that dam can be put in place without using air pressures higher than those which have been encountered in other works. That is a feature which stands in favor of the Nicaragua line and against the Panama.

Both structures are perfectly feasible; but the Conchuda dam involves less difficulty than the Bohio dam.

The net result of summing up those features, in my judgment, is decidedly in favor of the Panama route.

Senator HANNA. As to the dam question?

Mr. BURR. As to all the physical features of the two lines as waterways?

Senator HANNA. The whole line?

Mr. BURR. Yes; the whole situation.

Senator HANNA. What experience have you had in the construction of dams and deep foundations?

Mr. BURR. I have had considerable experience in the construction of deep foundations, but I have never put in a pneumatic foundation, as responsible engineer, of greater depth than 80 feet, although I am familiar with the experiences which have been had to depths of about 115 feet. The depth only, in my judgment, is not a final consideration of the conditions at Bohio. The greatest depth on the location selected by the Commission for its estimate is not under the river. It is on one side of the river. In fact, all the deepest part of that foundation is under land and not under water.

Of course, the water permeates through the underlying material up to its level in the river; but if a pit be sunk in that dry ground—that is, the ground which is dry on the surface—down into the clay and sand existing there, the water can be pumped out of that pit to an elevation which it may reasonably be expected is not less than 30 or 40 feet lower than the water in the river; hence the pressure of air under the foundations which would be put in place in such conditions would be correspondingly less.

In other words, instead of working at a depth of 128 feet under water, I am confident, from my experience in pumping down subsurface water elevations, that the pressure would not be due to a depth of water greater, certainly, than 100 feet, and I believe it would be less than that.

Senator HANNA. Less than 100 feet?

Mr. BURR. Yes; that is a point on which there is room for difference of engineering opinion, but that is my judgment, and it is judgment based on actual experience.

Senator HANNA. Now with reference to the Culebra cut, is there any practical or engineering difficulty in the way of the final construction of that cut as proposed?

Mr. BURR. Not in my judgment. I believe that is work which is perfectly feasible to accomplish. It is a great piece of work, but that is all. It will require for its prompt completion a suitable design of plant and proper organization, just as any great piece of work does; but that is all. It is excavation in the dry; it is the excavation of material which can be readily put in shape to be taken out of the cut and carried away. While the maximum depth is confined to a short distance of perhaps less than a mile, the total cut, the Culebra and the Imperdaor, which are practically one, is distributed over a length of some 6 or 7 miles.

Although that is much more concentrated than the work in Nicaragua, yet it is distributed enough to give a long line of attack, and it is a question in my mind whether that amount of concentration may not result favorably to prompt and economical completion rather than the reverse.

Under proper management and with a proper plant that degree of concentration gives an opportunity for all the benefits that can be derived from an effective organization and suitable machinery. Those advantages are very great.

Senator HANNA. Outside of those two propositions, the work along the Panama route is simply digging a canal in earth, is it not—earth and rock?

Mr. BURR. There is some rock.

Senator HANNA. Did you ever hear of any place along that route where there was a volcanic, porous, spongy rock that could not be blasted?

Mr. BURR. I have heard of that, although I can not give you a detailed statement of it.

Senator HANNA. An officer of the Navy testified here that he had been there, although not as an expert, and was told by the French engineers that there was 2 or 3 miles of porous rock, 7 or 8 feet under the soil, that they found they could not blast, that they would have to build cofferdams and cut it out. Did you hear anything of any such rock?

Mr. BURR. Yes; I have been informed of that, but rather obscurely, because the thing itself is not well defined, and I do not believe that anybody can locate it precisely or state precisely the difficulties which were experienced.

As that information has reached me, the rock was under water, and I can not tell you whether it is at one end of the canal or the other; but the situation, as I understand it, arose from the fact that the explosive was either not sufficiently confined or not properly placed. The light or porous material operated upon would not crack as solid rock does, and that consequently the explosive would grind off or demoralize the surface to some extent only. The force of the explosion would follow the line of least resistance vertically, and the result would be very inadequate to the amount of explosive used; but it is simply a question of managing the explosive properly. If you put it down into this coral rock or porous material, or whatever it is, the latter will certainly be thrown apart. There is no question about that. I have seen all kinds of material blasted, from hard clay to the hardest qualities of basalt and granite, and I have never yet seen anything that would lead me to suppose that an explosive confined properly, even in porous material, will not rupture it.

Senator HANNA. With reference to the Nicaragua route, you found no engineering difficulties there of a serious nature? I want to know about the canalization, and the embankments, and the curvatures on the Nicaragua route as compared with the Panama route.

Mr. BURR. There is much more of it in Nicaragua than in Panama. The portion of the Nicaragua route between the Conchuda Dam and Caribbean Sea, some 55 miles or thereabouts, involves a considerable amount of embankment work.

We have reduced that to a minimum, because such embankments are not altogether desirable; but still they are perfectly feasible. That feature constitutes no special objection to the route.

There are some embankments, some levees, on the Panama route also, but they are not serious features. It is only necessary, at some points on the Nicaragua route, where the excavation of the canal prism would be in sandy material, to puddle it, so as to guard against any objectionable seepage or leakage through the sand; but that is perfectly feasible. It is an ordinary procedure. It involves no special difficulties, nor is it at all costly, as such matters go.

Senator HANNA. The curvature, though, would make quite a difference in the difficulties attending the operation of the canal, would it not?

Mr. BURR. Curvature is objectionable to vessels going through a canal. It is perfectly feasible, of course, to tow vessels or steam them

around curves, but the less curvature there is the better, and if the curvature is very sharp, of course it may become highly objectionable. The curvature on the Nicaragua line was reduced much by our work. In fact, it was one of the principal ends to be attained in laying out the alignments; and it has been reduced to a matter which is not excessive for the location. As a general proposition, the less curvature involved in alignment the better.

Senator HANNA. Would there be an increased risk of operation, whatever the risk might be, in proportion to the length and curvature of the canal?

Mr. BURR. I should consider that those risks increase about in proportion to the length and curvature. It is not a matter which can be stated with mathematical precision.

Senator HANNA. No; I understand. The difference in the cost of maintenance and operation is fixed in the report at \$1,300,000 per annum. Do you think that will cover the difference?

Mr. BURR. I question whether it will cover the difference. It was the best estimate that we could make, and a great deal of time and study was put upon that feature of our work.

Senator HANNA. Colonel Ernst testified the other day that the figures were recently made \$1,350,000, and he was rather surprised that it was put in at \$1,300,000, because he understood the figures arrived at to be \$1,350,000.

Mr. BURR. \$1,350,000 is correct; but at the last moment there was a revision made, of which I was not myself aware, by which some elements were increased and others diminished, and it was intended to leave it at \$1,350,000, but by some small oversight the figures \$1,300,000 crept in; but it is a matter of very small moment.

Senator HANNA. When you get to talking about millions, \$50,000 does not sound very big; but that difference of cost of maintenance and operation is a legitimate charge against that route, and if reduced to capitalization at the government rate of interest would represent about \$65,000,000.

Mr. BURR. Yes; it would.

Senator HANNA. Which should be credited to the amount of the Panama Canal on the ledger. That would be your way of doing it?

Mr. BURR. That is a straight business proposition and the usual method of treating those matters.

Senator HANNA. A good deal has been said with reference to the operation of sailing vessels through these canals. Of course a sailing vessel would have to be towed through either of them, and the sharper the curvature and the more the canalization on the route the more tugs would be required.

Mr. BURR. Yes.

Senator HANNA. Do you think it would require the help of tugs to tow steam vessels through the Nicaragua Canal?

Mr. BURR. I think that the largest vessels would probably require some assistance of that kind, perhaps considerable. I see no reason why smaller steam vessels should not steam through.

Senator HANNA. But sailing vessels would all of them require tugs?

Mr. BURR. Sailing vessels would all of them have to be towed through either canal.

Senator HANNA. The difference in the length of the canal would reduce the expense of towage unless it was necessary to tow them well

out through the doldrums of Panama Bay. The matter of winds has been testified to here this morning; and several times before it has been stated that the trade winds blow steadily throughout the entire year on the Isthmus, and are particularly strong at Nicaragua, in the neighborhood of Greytown, on the east side of the mountain range. A large vessel, four or five hundred feet long and proportionately large, passing through the Nicaragua Canal, with these curvatures, would be affected more or less by those winds, would it not?

Mr. BURR. It would.

Senator HANNA. In handling the vessel?

Mr. BURR. To some extent. It is a question how much that effect would be. As a matter of fact, there is a very great variation in the intensity of the trade winds at Nicaragua. The trade winds were so gentle as practically to disappear at Greytown a considerable portion of the time that we were there. Those winds are not so uniform as may be supposed. The strongest winds that we encountered on that trip were, rather singularly, on the Panama route.

Senator HANNA. Well, a vessel going through either canal in reaching those summits would be pretty high above the water level and exposed to whatever winds there might be. Have you had any experience or any sources of information with reference to the traffic, as regards what we call our coastwise trade, between Atlantic and Pacific ports?

Mr. BURR. Do you mean as to that portion which would be likely to go through the canal?

Senator HANNA. Yes. Was that subject taken up by the Commission?

Mr. BURR. It was very carefully taken up.

Senator HANNA. By whom?

Mr. BURR. By Professor Johnson. In fact the Commission authorized him, practically as a committee of one, to take up that matter and report on it. There was a committee which had that matter in charge, and the results of its study are given in our report.

The CHAIRMAN. I want to make an observation to the committee. I have not summoned Professor Johnson, because I understood that the committee did not desire him to be summoned. If any gentleman desires it I will have him summoned at once.

Senator HANNA. If he has taken up that subject I would like to have him.

The CHAIRMAN. Very well; I will have a summons made out for him.

Mr. BURR. That matter, of course, is largely speculative, but it was the belief of the Commission that there would be considerable coastwise traffic, although it may not perhaps be possible confidently to state how much.

Senator HANNA. Testimony was given here by other members of the Commission that sailing vessels were not very much taken into account in the estimates of the traffic, as they considered that steam would eventually supplant or largely take the place of sailing vessels that would use the canal.

Mr. BURR. I believe that is so. That is my judgment and that was the opinion of the Commission. The question of the relative value of sailing vessels and steam vessels in the traffic which would seek the canal was carefully considered by the Commission. It was certainly my judgment, and I believe that I concurred with the Commission, that by far the larger part of the traffic passing through the canal,

wherever it may be located, will be in steam vessels and not in sailing vessels.

Senator HANNA. So that, in considering this question with reference to the lack of wind in the Bay of Panama, called the "doldrums," you did not consider that a very important feature?

Mr. BURR. We did not. It does not seem to me to be so. It may be observed, in that connection, that Panama has been a port, or was a port, for sailing vessels for more than two hundred years before steam vessels were known. There is no question about the fact that sailing vessels do, at times, in the Bay of Panama, experience difficulty by the lack of winds, but just how much I can not state confidently. There are many conflicting statements on that subject. It is my judgment, stating the thing as those matters impress me, that the additional cost of towage through the long Nicaragua Canal will go far to compensate or to balance the difficulties which sailing vessels would encounter on the Panama route.

Senator HANNA. The difference between 47 miles and 187 miles would take them pretty well out to sea on the Panama route?

Mr. BURR. I think, on the whole, it would nearly balance.

Senator HANNA. Do you know anything about the relative tonnage in this coastwise trade, so called, of sail and steam vessels? Have you ever investigated that?

Mr. BURR. I have, as given by the Statistical Abstract, of which I have a copy here, and by such other official sources as are available. The Statistical Abstract for 1901 shows that over 54 per cent of the total coastwise vessel tonnage of the United States for that year was propelled by steam, and that the preponderance has been on the steam side since 1894.

Senator HANNA. The statement was made here that 57 per cent of the tonnage engaged in coastwise trade was sail and the balance steam.

The CHAIRMAN. From Philadelphia.

Senator HANNA. Just from one port?

The CHAIRMAN. Yes.

Senator HANNA. I thought he meant the entire coastwise trade.

Mr. BURR. I have not been able to verify that.

Senator HANNA. You understood, then, Professor, from that statement, that in speaking of tonnage it meant the measured tonnage of the vessel itself, and not the carrying tonnage?

Mr. BURR. It is definitely so stated in the Statistical Abstract.

Senator HANNA. Can you turn to it?

Mr. BURR. In consequence of the more rapid movement of the steamers, the division of traffic tonnage will be much greater in favor of steam vessels than the ship tonnage.

The CHAIRMAN. I suppose that the contest, if there is a contest, between sail and steam vessels, depends very much upon the facilities for getting coal at particular localities, and on the cost of coal, does it not?

Mr. BURR. That affects the situation; it affects the traffic, undoubtedly.

The CHAIRMAN. In those places where you can not get coal at proper cost you would have a preponderance in favor of the sailing ships. Now, while we are on that point, I would like to ask you this question: Is not the steam navigation of the world, I mean the great steam lines of the world, except, perhaps, between New York and

Liverpool or Southampton, dependent upon sailing ships for its supply of coal?

Mr. BURR. I think not. I may be mistaken about that, but I think not.

The CHAIRMAN. You think they carry their own coal?

Mr. BURR. No; but I think that a great deal of coal is carried to coaling stations by steam ships.

The CHAIRMAN. Tramps?

Mr. BURR. Tramps and other vessels that can be chartered for that purpose, and in large barges that are towed.

The CHAIRMAN. How about the supply for the Navy at distant points of the world?

Mr. BURR. A navy man could answer that question better than I can. It is my impression, however, that even there, by far the greater part of the coal is carried to the coaling stations by steam power.

The CHAIRMAN. Do you state that as the result of a study?

Mr. BURR. No; I do not state that as the result of a study, but that is my impression from such information as I have had; but it is not the result of statistical study.

Senator HANNA. For your information I can give you some figures. Taking the Suez Canal, in the report of the passage of vessels other than steamers, in 1896 there were none; in 1897, none. In 1898 the returns were not completed. We have not got them. In 1899 there was one sailing yacht.

Mr. BURR. Pardon me; when you say none, you mean none under sail?

Senator HANNA. None under sail.

Mr. BURR. All under steam?

Senator HANNA. All under steam. Of vessels other than steamers passing the Suez Canal in 1899 there were six vessels; in 1900, one watch boat. That is the report from the Suez Canal as to the total number of sail vessels passing in six years prior to 1900. I understand you to say you have made some study of this proposition. Have you any suggestions to make?

Mr. BURR. I have already given the statistics for 1901, as taken from page 458 of the abstract for that year.

The point to which I wish to call attention is that the total vessel tonnage, not traffic tonnage, for 1901, of vessels employed in the coastwise trade, exclusive of whale fisheries and other fisheries, the total employed exclusively in the coastwise trade was 4,582,645 tons, of which the steam part is 2,491,231 tons, or over 54 per cent. The steam portion of that tonnage has exceeded one-half of the total since 1894. Now, that is the total coastwise trade. That includes the Pacific and Atlantic coasts, the Great Lakes, and all of the ship traffic which could be called coastwise. That is, the tonnage of the vessels.

In 1901 there was built in the United States a steam-vessel tonnage, that is, gross tonnage, of 273,591 tons, and a sailing tonnage of only 126,165 tons. This is a matter of which I speak perhaps a little more emphatically than I otherwise should, because I have had occasion to make some examination of that question in connection with the port of New York.

Senator HANNA. I was going to ask you what you consider the relative carrying capacity of steam and sail, taking into account the rapidity of making voyages of steam over sail, taking the trade as a whole?

Mr. BURR. I should think that it would be conservative to say that you could divide the proportion of sail-vessel tonnage by two, in order to get the proportion of sail-traffic tonnage.

The CHAIRMAN. You mean in regard to the United States?

Senator HANNA. The carrying capacity.

Mr. BURR. The carrying capacity.

The CHAIRMAN. Are you speaking now of the United States or the world over?

Mr. BURR. The United States.

Senator HANNA. The coastwise trade.

Mr. BURR. The coastwise trade. I give that proportion without figures at hand; but from my information of those matters, and from such familiarity as I have with the subject, I should say that that would be a conservative estimate.

Senator HANNA. I can give you Lloyd's figures as to the world's trade.

The CHAIRMAN. I should like to hear that.

Senator HANNA. Lloyd's figures for the shipping of the whole world, for 1890, are, sail, 9,166,279 tons; steam, 12,985,372 tons.

Mr. BURR. That is the vessel tonnage I suppose?

Senator HANNA. Yes; steam and sail.

Mr. BURR. Yes; but it is vessel tonnage.

Senator HANNA. Yes. Now, in 1901, sail, 6,591,627, which is a falling off of 2,500,000 tons; steam, 24,883,000 tons, which is virtually a doubling of the amount.

Mr. BURR. That confirms my investigation.

Senator HANNA. Those figures are taken from Lloyd's.

The CHAIRMAN. It occurs to me that if that rate of progress in the construction of steamship goes on the price of coal will go pretty high.

Senator HANNA. I do not think so. The price of coal has steadily declined. I have been in the coal business for thirty years, and the price of coal is lower to-day than ever before in the history of the country, and lower every year in the last ten years than in the previous year.

The CHAIRMAN. How is it on the coast of South America?

Senator HANNA. I know nothing about the coast in South America. We have no ships running to South America.

The CHAIRMAN. Oh, yes; we have.

Senator HANNA. Steam vessels—I do not know where they are.

The CHAIRMAN. Yes.

Senator HANNA. I do not think there are any under the American flag.

The CHAIRMAN. Oh, yes; our naval ships.

Senator HANNA. Oh, men-of-war. I did not refer to them. The question of fuel will adapt itself to the necessities of the case. As far as the supply of coal in the United States is concerned, your State alone can prevent any very high prices of coal in the future. The improvements of machinery and the economies of steam have been simply wonderful.

You were asking the question with reference to the transportation of coal. Except on the Atlantic coast I do not know of any large coal trade where the coal is carried in sailing vessels.

Mr. BURR. I do not know of any.

Senator HANNA. Except where it is carried as ballast or something of that kind.

Mr. BURR. I think a very large majority of the coal that is carried to coaling stations, take it the world over, is carried under steam power.

Senator HANNA. Almost exclusively.

Mr. BURR. A good deal is towed in barges, but it is all under steam power.

Senator HANNA. The figures I read with reference to the Suez Canal show that in six years there were six vessels under sail passed through the Suez Canal, one yacht, and one what they call a watch boat.

During those years the gross tonnage, that is the vessel measurement, passing through the Suez Canal was in 1896, 12,039,000 tons; in 1897, 11,123,000 tons; in 1898, 12,952,632; in 1899, 13,815,992 tons, and in 1900, 13,699,237 tons. Out of that tonnage, which aggregated about seventy-five or eighty million tons, there were only six sailing vessels passed through the Suez Canal.

The CHAIRMAN. You are reading now about the Suez Canal?

Senator HANNA. Yes; that is taken from Lloyd's Report.

Now, the cost of operation for a steam vessel through that isthmian canal, taking into consideration the larger class of vessels that are being constructed now, would make it almost impossible for a sailing vessel to profit by that transportation, would it not?

Mr. BURR. Practically so. That was the opinion of the Commission.

Senator HANNA. And although we have recently built quite a number of very large 4-master schooners and 6-master schooners and one 7-master is building, that class of vessels would only be profitable on very long voyages, without anything except the cost of the operating of the vessel to be considered?

Mr. BURR. Yes.

Senator HANNA. And probably in the transit from San Francisco to New York, or vice versa, would go around the Horn in preference to going through the canal.

Mr. BURR. It probably would. There would perhaps be once in a while a sailing vessel that for some reason would desire to go from one ocean to the other so quickly as to make it desirable to go through the canal; but I believe there would be very few.

Senator HANNA. Are you familiar with the trade between New York and San Francisco, and do you know what portion of vessels carrying wheat and lumber from the Pacific coast come to the Atlantic coast?

Mr. BURR. I am not closely familiar with it. I think the percentage is very small.

Senator HANNA. Is it not a fact that the export trade from the Pacific coast is almost entirely those two commodities—grain and lumber?

Mr. BURR. Yes.

Senator HANNA. And almost entirely to European markets?

Mr. BURR. Grain, I think, entirely so; some lumber may come to New York.

The CHAIRMAN. What route does it go by?

Senator HANNA. It goes around the Horn, except that which goes to the Orient.

Mr. BURR. A little demand is growing for cargoes of Oregon lumber in New York. I am engaged at present on a piece of work where, if the conditions as now existing could have been foreseen six months

ago, one or two cargoes of heavy Oregon fir would have been shipped around the Horn.

Senator HANNA. Long, straight timber.

Mr. BURR. Yes; but I doubt whether that kind of a cargo has ever been brought around the Horn to New York. I doubt whether there has been even one whole cargo.

Senator HANNA. They use Oregon timber largely for spars?

Mr. BURR. Yes; but I am speaking of whole cargoes. There have been a few pieces sent.

The CHAIRMAN. What kind of work is it that you refer to in which they use this timber?

Mr. BURR. Do you mean what I have just made reference to?

The CHAIRMAN. Yes.

Mr. BURR. It is the tunnel under the Harlem River, forming a part of the subway construction now being completed in New York City for the local traffic about the city.

The CHAIRMAN. And that timber is needed for propping purposes, is it?

Mr. BURR. One might call it propping purposes, but it is for a temporary roof. The tunnel is not being constructed exactly as a tunnel in the ordinary sense of the word, but with a temporary heavy timber roof of four thicknesses of timber, and there is a considerable amount of heavy timber required for other temporary purposes in connection with it. If the contractor could have foreseen the present situation, he probably would have brought around a cargo of that lumber.

The CHAIRMAN. He would have brought around several, would he not?

Mr. BURR. Probably a cargo would have answered his purpose.

The CHAIRMAN. These observations are only applicable to the tunnel under the North River?

Mr. BURR. It depends, of course, upon how the tunnel is constructed.

The CHAIRMAN. Mr. Noble is conducting that, is he not?

Mr. BURR. He is the chief engineer of the tunnel under the East River.

The CHAIRMAN. I thought it was the North River.

Mr. BURR. The particular portion of the work of which he is chief engineer, as I understand it, is under the East River, and Mr. Charles M. Jacobs is the chief engineer of the portion under the North River. That is my understanding.

Senator FOSTER, of Louisiana. What is the difference in distance between, say, San Francisco and New York, by the Nicaragua route and by Cape Horn?

Mr. BURR. I am sorry that my memory will not carry figures, but it goes up into the thousands of miles.

The CHAIRMAN. Ten thousand or more?

Mr. BURR. Yes; it is a considerable number of thousands.

The CHAIRMAN. It is the length of the continent of South America on both sides.

Senator FOSTER, of Louisiana. Is it true that a vessel would take that route around the Horn and travel that distance in preference to going through the canal?

Mr. BURR. Of course a steam vessel would not, but a sailing vessel, with a cargo like lumber, which is in no special haste, might take that route. I believe that a great majority of these cargoes which are

nonperishable and for which there is no special haste would go around the Horn rather than to go through the canal.

Senator HANNA. But the advantages of the canal will favor the construction and operation of steam vessels rather than sail, except for heavy freight.

Mr. BURR. Altogether. In fact, it is the opinion of the Commission that the decision of the question, so far as that feature is concerned, may be based wholly upon steam vessels, without being in error.

Senator HANNA. I have given you the figures for the Suez Canal, showing that for six years all the trade to the Orient, and to Africa, and to Australia, of whatever nature, has been carried by steam vessels, except in the case of six vessels carrying freight under sail, that passed through the canal.

The CHAIRMAN. That is a great misfortune, but that is chargeable to nature, not to steam or wind.

Senator FOSTER, of Louisiana. I should like to ask Professor Burr why a vessel should take the Cape Horn route rather than the quicker canal route—I refer to a sailing vessel?

Mr. BURR. In the first place, for sail cargoes the element of time is scarcely concerned. Then the vessel must pay the canal tolls, if there are tolls, and I suppose we must assume that there will be for the present. Again, tonnage must be paid for, and the cost of insurance in the canal, a considerable item, must be incurred. The sum of all the expenses, as well as the risk, will be greater through the canal than around the Horn.

The CHAIRMAN. When the price of wheat in New York is \$7 a ton above what it is at Portland, Oreg., or at any of those ports, would not the element of haste have some significance to the wheat carrier of that western country?

Mr. BURR. I suppose in the matter of wheat it would pay a man to fix his sales before he shipped his wheat. He would want to know exactly what he was going to get for it under the conditions of transportation which he arranges.

The CHAIRMAN. What is the length of the voyage around the Horn, from New York to Portland, in days?

Mr. BURR. I do not think that any wheat would be shipped from New York to Portland.

Senator HANNA. You mean from Portland to New York, Senator.

The CHAIRMAN. I am asking as to the length of the voyage. I do not care which end you take.

Mr. BURR. I question whether wheat would be shipped from Portland to New York.

The CHAIRMAN. That does not concern the length of the voyage. What would be the length of the voyage in days?

Mr. BURR. I do not know that I can give you that without looking it up.

The CHAIRMAN. Would it not be as much as a month in a sailing ship?

Mr. BURR. I was going to say that it would be far more, at a guess.

The CHAIRMAN. Two months?

Mr. BURR. I should not like to be bound to such an answer without looking it up, but I should suppose it would be probably nearer two months than one.

The CHAIRMAN. How could a wheat seller at Portland know what the price of wheat would be in New York two months after date?

Mr. BURR. He would certainly be a very imprudent merchant if he did not know what he was going to get for his product when it reached its destination.

The CHAIRMAN. You mean that he would sell it before it left?

Mr. BURR. Yes. Wheat is now shipped from San Francisco, and I suppose from Portland, to Europe whenever the conditions of the market will permit. I do not know how frequently that is, but there are times when the wheat growers of California can not ship it.

The CHAIRMAN. And that throws the wheat producer upon the European market, and he is cut out from the American market.

Mr. BURR. He sells what he can in the American market.

The CHAIRMAN. But he can not sell any, because he can not get it there in time.

Senator HANNA. Is it not a matter of fact that there is no wheat shipped from California to New York?

Mr. BURR. That is the statement I made a moment ago.

Senator HANNA. Absolutely not?

Mr. BURR. I do not think any wheat will ever be shipped from California to New York.

Senator FOSTER, of Louisiana. Would sailing ships have the same objection to going through either one of these routes, the Panama route or the Nicaragua route?

Mr. BURR. So far as the passage of the canal is concerned, the disadvantages would be much greater by the Nicaragua than by the Panama, because it is so much longer and there is so much more curvature.

The CHAIRMAN. Have you any further answer to that question?

Mr. BURR. The less wind in the Bay of Panama would, at times, operate against whatever advantages the Panama route might have; but it is my judgment, take it year in and year out, that the disadvantages of the Nicaragua route, involving towage and risks, would be fully as great as those of Panama.

Senator FOSTER, of Louisiana. Then, if I understand you correctly, neither one of these canals will be of much benefit or advantage to sailing ships?

Mr. BURR. I think that neither one will be used to any sensible extent by sailing vessels.

Senator HANNA. I should like to ask you if you consider the proposition made to the Panama Canal Company, of forty million dollars for their entire property, a reasonable price?

Mr. BURR. I consider it a very reasonable price.

Senator FOSTER, of Louisiana. Do I understand that you express the opinion that neither one of these canals will be utilized except by vessels propelled by steam power?

Mr. BURR. It is my judgment that neither canal would be utilized to any sensible extent by sailing vessels. I believe that the character of the traffic to which they are adapted, and the comparatively rapid displacement of sailing vessels by steam, are such that sailing vessels will not take either canal route to any sensible extent.

The CHAIRMAN. Believing that, are you in favor of building either line to the exclusion of sailing ships?

Mr. BURR. I would not build it to exclude sailing ships, but I believe

that will be the natural result of it; that it will be found advantageous to conduct practically all the traffic with steam as a motive power, whether the canal be located on one line or the other.

The CHAIRMAN. If sailing vessels are to be excluded in this way, are you in favor of building any canal at all?

Mr. BURR. I can not accept the premise that they are to be excluded.

The CHAIRMAN. If they exclude themselves, if the circumstances are such that they can not use it profitably, are you in favor of any canal at all?

Mr. BURR. I am, most certainly, because I believe that the great carrying trade of the world is very soon going to be found carried almost entirely under steam power. That is my judgment. And that is not based altogether upon the examinations in connection with this question. It is a question which I have had more or less to do with in past years in connection with the port of New York. I get my impressions fully as much from the examinations made at that time as now. I believe that the statistics available at the present time showing the record of maritime business point to that result.

The CHAIRMAN. Then, do you give up to the proposition that we can not compete with European maritime powers in carrying on commerce with the Orient by sail, that we can not compete from New York with those ports?

Mr. BURR. I believe that we can compete with them under any circumstances that will exist. I think that we are fully able to compete with them, and can compete with them successfully; but I believe that the conditions under which that competition is going to exist will be such as to make steam power, or artificial power, to put it more broadly, the motive power to be used.

The CHAIRMAN. I will take a ship sailing from Liverpool or Southampton on a given day, of a given tonnage, by way of the Cape of Good Hope, and a ship sailing from New York on the same day with the same tonnage by either of the routes, by the Horn or by the Cape of Good Hope. Which point of departure would have the advantage of the short line?

Mr. BURR. I do not know that I can answer that question offhand.

The CHAIRMAN. Have you never studied that proposition?

Mr. BURR. Yes; that proposition has been very carefully studied in the Commission; but that is one of the places in which the conditions are pretty nearly equal. In fact, it may be affected by the new conditions which would be brought into existence by the completion of the canal.

The CHAIRMAN. I am speaking about conditions as they are, leaving them just as they are. Which of those ships that I have referred to would have the short line on a voyage to Hongkong?

Mr. BURR. I am inclined to think that the ship leaving New York would have a slight advantage. The equidistant point is in the eastern portion of Australia. That is, it is along the dividing line, and I think the ship leaving New York for Hongkong would have a little advantage.

The CHAIRMAN. By which route, the Cape of Good Hope or Cape Horn?

Mr. BURR. Around Cape Horn.

The CHAIRMAN. Now, how would it be at Yokohama?

Mr. BURR. Those points are all pretty near on the dividing line;

but I should say that sailing vessel would have the advantage at Yokohama. Those distances are so nearly balanced that I feel a little uncertainty about answering that kind of a question without referring to the perfectly well-known figures of what those distances are.

The CHAIRMAN. I will come back to that subject probably after a while. You hold a professorship in a New York college, I believe.

Mr. BURR. Columbia University.

The CHAIRMAN. What chair do you hold there?

Mr. BURR. Civil engineering.

The CHAIRMAN. Does that include subterranean and submarine engineering?

Mr. BURR. Yes; it includes pretty much everything except military and naval engineering.

The CHAIRMAN. That includes, of course, of necessity, the study of geology?

Mr. BURR. To a considerable extent. Our students are not supposed to be geological experts, but the general principles of geology are taught, and taught thoroughly.

The CHAIRMAN. Subterranean and submarine engineering are based on geology, are they not?

Mr. BURR. Not very much, Senator. Geological questions, of course, come in to some extent.

The CHAIRMAN. I mean, could a man be considered as intelligent even in his profession as a subterranean or submarine engineer, or a mining engineer, if you please, who had no knowledge of geology?

Mr. BURR. Oh, no; far from it.

The CHAIRMAN. Then that is necessary, is it?

Mr. BURR. Yes.

The CHAIRMAN. And you, in your contemplations, in your studies and teachings of these questions, have of course given instruction upon the geological formations which you would have to attack or to meet in these different varieties of engineering.

Mr. BURR. Not as geological questions. The instruction in geology is given by the department of geology, not the department of civil engineering. That instruction is given to the students in civil engineering, however.

The CHAIRMAN. And an engineer can not be an educated engineer, with reference to subterranean or submarine structures, unless he has acquired a knowledge of geology?

Mr. BURR. He should have a knowledge of geology. I should not consider him a completely educated civil engineer unless he had knowledge of the general principles of geology.

The CHAIRMAN. My reason for asking these things is that I want to ask you some questions about geology as we go along; and I want to preface that, if you please, Professor, by asking you if you are consulting engineer for a great many public works?

Mr. BURR. I have been and am now.

The CHAIRMAN. What are they?

Mr. BURR. I am at present consulting engineer to the department of bridges of New York City in the construction of a bridge across the Harlem River at One hundred and forty-fifth street, and consulting engineer to the contractor who has the construction of the Harlem River tunnel as a part of the subway work now being constructed in New York City.

The CHAIRMAN. Very well. You have been consulting engineer for many other works outside of New York, have you not?

Mr. BURR. Yes.

The committee (at 12.20 p. m.) took a recess until 2 p. m.

AFTER RECESS.

The subcommittee met at 2 o'clock p. m.

Present: Senator Morgan (chairman); also Senator Kittredge, a member of the committee.

ADDITIONAL STATEMENT OF WILLIAM H. BURR.

The CHAIRMAN. I believe we were asking you about the works outside of New York City on which you had been consulting engineer.

Mr. BURR. Do you wish a statement as to those with which I have been connected? I gave you those with which I am now connected.

The CHAIRMAN. Both.

Mr. BURR. In addition, then, to those which I named before the intermission, I have been consulting engineer for the department of parks of New York City, for the department of docks of New York City, and I have also been a member of the board of engineers appointed, either by the Secretary of War or the President of the United States, to consider a proposed bridge across the Hudson River at New York City, and about five years ago I was appointed by the President of the United States a member of a board to locate a deep-water harbor on the coast of southern California.

The CHAIRMAN. That is down at San Pedro.

Mr. BURR. San Pedro; and I have recently, within a week, been asked by the governor of Porto Rico to act as consulting engineer for certain harbor and dock work which it is proposed to build on the island of Porto Rico, but I have not yet commenced the duties of that appointment.

The CHAIRMAN. Well, outside of New York, have you had any connection as consulting engineer or otherwise with the great railroads leading across the continent.

Mr. BURR. Not as consulting engineer for the railroads. For several years I was connected in various capacities and finally as general manager of the Phoenix Bridge Company, and in that capacity built a great many bridges for railroads, but I have not been engaged as consulting engineer for any railroad company.

The CHAIRMAN. Well, I will now begin, Professor, in order to get this thing consecutive, so that it can be understood, at the harbor of Colon. What works were projected, if any, by the Isthmian Canal Commission to protect the harbor of Colon against the invasion of swells in the sea produced by—

Mr. BURR. It will be necessary at Colon to excavate, first, an entrance to the harbor at the mouth of the proposed canal, and then complete the excavation for an inner harbor, which has already been begun by the French company.

The CHAIRMAN. I was speaking about the outer works, rather. Are there any outer works arranged to keep the sea out—to break the force of it?

Mr. BURR. There are no outer works needed for that purpose under

the plan of the Commission, as the interior harbor will be completely protected from the northerners.

The CHAIRMAN. Your proposition, then, to protect the harbor or any part of it from the northerners is based upon your ability to create an inner harbor which will furnish protection?

Mr. BURR. Yes.

The CHAIRMAN. Therefore you make no outer works at all.

Mr. BURR. No outer works are needed for that purpose.

The CHAIRMAN. Well, you do not make any, whether they are needed or not.

Mr. BURR. No; we do not make any.

The CHAIRMAN. If there are no outer works there, will not the full force of those northerners, with the ocean swells, roll into that harbor?

Mr. BURR. No; the entrance is behind a point.

The CHAIRMAN. I mean the great harbor of Colon.

Mr. BURR. The harbor of Colon would be in the same condition in which it is now, without protection against those northerners. A ship seeking the canal would not stop in that outer harbor. It would pass into the protected harbor at the end of the canal.

The CHAIRMAN. This point behind which you propose to build the interior harbor is the same point upon which De Lesseps has his residence and his son's residence.

Mr. BURR. There were two large frame buildings there. I do not know that De Lesseps and his son constructed them as residences, but that may be. They are two large frame houses, which are sometimes extravagantly called palaces. They are located on that point.

The CHAIRMAN. And it is behind that point that you are going to dredge a harbor for the purpose of protecting the ships against the northerners?

Mr. BURR. It is behind that point and still again inside of the shore line of that part of the bay.

The CHAIRMAN. You expect to excavate a harbor inside the shore line along the canal?

Mr. BURR. Yes; it is just at the mouth of the canal.

The CHAIRMAN. At what depth will the canal enter the harbor?

Mr. BURR. The minimum depth is 35 feet.

The CHAIRMAN. At what width would it enter the harbor?

Mr. BURR. The standard harbor entrance width is 500 feet.

The CHAIRMAN. Is there proposed to be a pier or mole to which vessels can moor?

Mr. BURR. There would be in the interior harbor.

The CHAIRMAN. What would be the length of that?

Mr. BURR. I can not give you that exactly without referring to the figures. Our plan shows that at once, but I would have to look it up in that part of the report devoted to the Panama route. Its width is 800 feet. It is a turning basin, as we term it. The length of the interior harbor is 2,000 feet.

The CHAIRMAN. Is that the point that is called Limon Point?

Mr. BURR. No; that bay is called the bay of Limon, but that point is called Christoph Colon. There is a statue of Christopher Columbus there.

The CHAIRMAN. Is not that the same point called Limon Point in the hydrographic surveys?

Mr. BURR. I think not.

The CHAIRMAN. Do you know of any point there that is called Limon Point?

Mr. BURR. No, sir; it is possible that they called it Limon Point on the hydrographic chart.

The CHAIRMAN. Do you know a point there called Toro Point?

Mr. BURR. The name is familiar to me, but I can not place it.

The CHAIRMAN. Is that not a little to the left of Limon Bay, as you go out north?

Mr. BURR. It may be the point on which the light-house is located. I think that is Toro Point.

The CHAIRMAN. How far would that be from the line on which ships would enter?

Mr. BURR. That is a long distance—that is, if I have the correct impression. That point must be a mile or two to the right of where ships enter the bay.

The CHAIRMAN. You were not there during any storms, were you?

Mr. BURR. No.

The CHAIRMAN. How much actual time have you spent in observation upon the Bay of Colon?

Mr. BURR. We were at the Bay of Colon about three weeks, if I recollect correctly. It was about that time. We stayed at one of the houses called De Lesseps's palaces. The Commission was divided between the two.

The CHAIRMAN. You made your headquarters there, and went out to examine the canal by rail?

Mr. BURR. By rail, generally; but when we went up the Chagres River we went by horseback, and we also made a trip of examination to the Gigante spillway by horseback; but our general plan was to make our headquarters at Colon, and then go backward and forward over the line by rail.

The CHAIRMAN. I want to read you now some extracts from sailing directions prepared by the Bureau of Hydrography, in Document 64, volume 11, second edition, Coast Survey from the Rio Grande del Norte to Cape Orange, with Adjacent Islands and Dangers, published in 1860, and supplement No. 1, published in 1891:

“Limon Point, on the west side of the inner part of the bay, stretches a little to the eastward, and affords shelter under its south side for small vessels in $2\frac{1}{2}$ or 3 fathoms water.”

That must be the point about which we are speaking.

Mr. BURR. It may be; that is about the right depth of water.

The CHAIRMAN. And about the right direction.

Mr. BURR. Yes.

The CHAIRMAN. I will continue:

“In the season of the north winds, the bay being completely exposed in this direction, a heavy swell rolls in. These winds, however, occur only in November, December, and January, then but rarely, and they are seldom violent.

“*Indications of a norther.*—The approach of a norther on this part of the coast is indicated by a long, heavy swell from the northward for two or three hours before the storm bursts. The sky has a somber, threatening appearance, the atmosphere is murky and chilly, and there are often fitful showers of rain in large drops. The clouds move from the northward for at least a day before the storm begins, and gradually increase in heaviness and extent. During the prevalence of these

storms the wind continues from the northward or northwestward, although the direction of the surface winds which precede them seem to give no indication of their approach. In the majority of cases the wind blows from the northeast or east-northeast with uniform force for several days before the storms, but one of the most violent of these gales which have occurred for many years was preceded by moderate southeasterly breezes, which continued until about eight hours before the storm began. The duration of these storms is from one to three days.

“The practice instituted by the mail steamers of casting off lines and standing to sea on the approach of a norther is shown to be the best method to escape injury. It is true that the ground is good for holding, but only the stoutest kind of a vessel with perfect ground tackle could withstand the heavy sea while at anchor, and the danger to which vessels of deep draft would be particularly liable results from their excessive rise and fall owing to the roughness of the sea.”

Does that agree with your observation?

Mr. BURR. It agrees with my impressions and observations. We had a strong wind several days while we were there—two or three days—but nothing that gave any inconvenience to shipping; but it is a fact that probably during two or three days of each year vessels in the harbor have to stand out to sea to escape the injuries there.

The CHAIRMAN. That could not occur as to the vessels on the inside harbor?

Mr. BURR. That could not occur.

The CHAIRMAN. The one in shore?

Mr. BURR. It could not occur in the harbor that is laid out for the mouth of the canal. Ships in there would be perfectly protected.

The CHAIRMAN. Now, here is a statement obtained from a captain of one of these steamer lines from New York to Colon, which is adopted by the Hydrographic Office and put in as a part of their sailing directions:

“*Depth of water at wharves—Buoys—Wreck removed.*—The uniform depth of water at or near the end of all the wharves, from pier No. 1 to the Pacific Mail Company’s wharf, is about 28 feet. The buoys formerly off these wharves do not exist, and there is no intention of replacing them.

“The buoy off Manzanillo Point is moored just outside of the 5-fathom curve, about 250 yards north 72° west of the light-house.

“A buoy is moored about 100 yards south 45° west of the northwest end of the head of that wharf and one 100 yards south 34° west of the southeast end.

“The only wharf having a boat landing is a small wharf (not indicated on the chart), built out from the bulkhead extending northward of pier No. 1. The wharf is about 30 feet wide, 146 feet in length on the north side, and 118 feet on the south side. The distance between the wharf and pier No. 1 is 85 feet.

“A recent norther badly wrecked pier No. 5, belonging to the Panama Canal Company. All buoys at entrance to the canal dragged out of position. It is not probable the pier will be rebuilt or the buoys replaced unless work is resumed on the canal.

“The bottom of the port is strewn with anchors and chains and wreckage of all kinds. A vessel in need of an anchor and chain could easily procure one by sweeping.

"The wreck of the *Rambler* has been blown up and all débris towed out of the harbor. There is now a least depth of 28 feet of water over the position formerly occupied by the wreck."

Now, what would be the dimensions of the bay that is proposed to be dredged there in which vessels will anchor after entering the main bay of Limon?

Mr. BURR. I will read just a paragraph from the report:

"Beginning at the 6-fathom line in Limon Bay, a channel 500 feet wide at bottom, and with side slopes 1 on 3, is excavated, curving gently to the left upon a radius of 6,560 feet, until it reaches a point just inside the jetty constructed by the old Panama Canal Company. Here it changes direction to the right upon a curve of 3,280 feet radius, and is then conducted upon a straight line for a distance of 2,000 feet to a point 2.39 miles from deep water in the bay. For about a mile this wide channel is inside the shore line, forming a narrow but well-protected harbor. Near the apex of the second curve the bottom width is increased to 800 feet for a length of 800 feet, to provide a turning basin. The estimated cost of this entrance and harbor is \$8,057,707, of which \$1,936,991 is for work outside the jetty. The annual cost of maintenance is estimated at \$30,000."

The CHAIRMAN. Now, do you think that it is possible to erect a work there, a jetty at any point from the Bay of Limon, that would prevent the coming in of these heavy waves that a norther brings in?

Mr. BURR. It is perfectly feasible if it were required.

The CHAIRMAN. How would it be done?

Mr. BURR. It is a much easier place to construct and maintain a breakwater than it is where the Delaware Breakwater is now placed and maintained. The storms are less severe and there are far less of them in number. There are only two or three days in the year when it is necessary for the ships to put to sea in the present condition of Colon Harbor.

The CHAIRMAN. What would be the length of that breakwater, and how would it start, and in what direction would it run?

Mr. BURR. It would be located, if it were to be built, so as to break the seas that now roll in, and its length would depend upon the area desired to be protected. Its general direction would be approximately at right angles to the present pier lines, or approximately parallel to the shore, where the present piers are located, and that is three-quarters of a mile, probably, from the entrance to the canal; but no such work would be required to protect the canal entrance.

The CHAIRMAN. About what would be the length of that breakwater?

Mr. BURR. That would depend on the area which it is desired to protect.

The CHAIRMAN. Well, for the uses of the canal.

Mr. BURR. It is not needed at all for the uses of the canal, nor for the shipping that would seek the canal. The shipping which seeks the harbor of Colon gets along without it at the present time and would always get along without it just as well as now.

The CHAIRMAN. Reference was made, in what you read there from the report, to a jetty that was built by the French. What is that jetty?

Mr. BURR. That refers to some work that was done behind this point, where the canal leaves the bay proper and enters the land, and also to some work which was done at this point, this artificial point.

The CHAIRMAN. The point on which the De Lesseps houses were built?

Mr. BURR. Yes.

The CHAIRMAN. My difficulty is this, that Mr. Morison described that as a point and said that it was not a jetty.

Mr. BURR. Well, it is not a jetty, but there is jetty work done on one side of it.

The CHAIRMAN. On the outside?

Mr. BURR. Both the inside and the outside, but only on the point, to protect the shore from the rollers.

The CHAIRMAN. That entire point on which those houses are situated was made ground?

Mr. BURR. It is made land; it is artificial.

The CHAIRMAN. Now, the bottom of this bay you propose to dredge, what is the material?

Mr. BURR. Sand and silt, and there is some rock, but I do not know how much of it.

The CHAIRMAN. There were no borings made there?

Mr. BURR. There were no borings made just at that point. The information as to the character of that bottom is fairly complete, but borings were not made to determine just how much would be required.

The CHAIRMAN. Well, I suppose you would derive the information from the French engineers?

Mr. BURR. Partly from their reports and partly from the information existing on the harbor charts.

The CHAIRMAN. That is the chart of the United States Government?

Mr. BURR. Yes.

The CHAIRMAN. Now, we will go into that canal. You get how far before you find obstructions in it toward Bohio?

Mr. BURR. May I ask what obstructions? The excavation must be begun right at the entrance to the canal. Nothing is completed, although much excavation is made.

The CHAIRMAN. Do you mean for the purpose of getting a deeper canal, or for the purpose of dredging out one that is there and filled up?

Mr. BURR. Well, the two purposes are the same. What I mean is, the deeper canal would be made by excavating the existing canal, which is neither so deep nor so wide as it is required to be by the Commission's plan.

The CHAIRMAN. Well, I will ask you generally, the entire canal dug by the French there would have to be excavated deeper and widened as far up as Bohio?

Mr. BURR. All the way across.

The CHAIRMAN. Clear across the Isthmus?

Mr. BURR. There is no place where the full section is done. They did not contemplate so large a prism as the Commission prescribed.

The CHAIRMAN. What was their prism?

Mr. BURR. I shall have to ask your indulgence as to my memory of exact figures. General impressions stay with me, but exact figures do not and I shall have to refer to the report for that. The bottom width of the French plan is 98 feet.

The CHAIRMAN. Your plan is how wide at the bottom?

Mr. BURR. One hundred and fifty feet.

The CHAIRMAN. How deep is the French and how deep is yours?

Mr. BURR. The French was 29½ feet, minimum water, and the commission's depth is 35.

The CHAIRMAN. Now the enlarging of the canal to these dimensions would extend through the whole length of it?

Mr. BURR. Yes; there is no section excavated to the extent that the Commission requires.

The CHAIRMAN. Out on the other side into the bay of Panama, to get the anchorage?

Mr. BURR. All the way through.

The CHAIRMAN. You found that canal to be filled up, or pretty nearly filled up, as you went along the line of it?

Mr. BURR. Between Bohio and Colon it is partially filled, both from the washings in of the silt near the mouth and also from sand and silt brought down by the Chagres, which flows for some distance through the excavated canal, and also from one or two small rivers, the Mindi and the Gatuncillo.

The CHAIRMAN. At what place in that navigation of this canal from Colon up did you find the first shallow water in the canal?

Mr. BURR. Right at the shore line, just where the canal goes into the bay of Colon.

The CHAIRMAN. What made that silting up there—what water?

Mr. BURR. That was probably washed in, perhaps all of it, certainly most of it, from the bay.

The CHAIRMAN. Water coming into the bay and backing up into the canal?

Mr. BURR. Yes.

The CHAIRMAN. That is a factor nobody has yet dealt with in this matter, the liability of that canal to be silted up by sand washed in from the bay in time of high water and time of wind. Is there any such liability?

Mr. BURR. No; that washed in through the mouth of the River Mindi. With a completed canal that would be closed and protected so that it could not possibly wash in. There would be some little deposition of silt, as there is everywhere where there is water, but nothing that would amount to anything.

The CHAIRMAN. Where is the next important silting up of the canal after you pass that point that we have just been speaking of?

Mr. BURR. There is some deposition all along from that point up to the place where the canal line joins the Chagres near Bohio—not quite up to Bohio; but nearly up to Bohio.

The CHAIRMAN. That canal line practically joins the Chagres before it gets to Bohio.

Mr. BURR. I should perhaps have made that clearer by stating that it is the point where the canal line leaves the Chagres for the first time in going from Panama toward Colon.

The CHAIRMAN. That would be below Gatun, would it not?

Mr. BURR. No, sir; it is not below Gatun. It is below Bohio.

The CHAIRMAN. It is 4 or 5 miles below Bohio, near the point we call Gatun.

Mr. BURR. Yes.

The CHAIRMAN. Now, on either side of this canal from Colon up to the point where we are at now were there embankments?

Mr. BURR. Embankments will be needed. Perhaps I interrupted your question.

The CHAIRMAN. No.

Mr. BURR. Embankments will be needed, and there are some

embankments formed by the excavated material by the French company which will have to be reexcavated in forming a larger prism.

The CHAIRMAN. What is the condition of those embankments left there by the French?

Mr. BURR. They are simply rough dikes of earth.

The CHAIRMAN. Have not they disappeared to a large extent, or washed away?

Mr. BURR. They are very strongly in evidence there, I can assure you, still. Their surfaces have been somewhat washed down by the heavy rains of the rainy season, but they are great piles of earth.

The CHAIRMAN. Now, the silt that is in that canal between Gatun and Colon by the side of the little river you mentioned a while ago—where does that come from?

Mr. BURR. The Mindi.

The CHAIRMAN. Yes, besides that, the balance of the line of the canal, between the Mindi and the Gatun, where does the silt come from that is filled into that canal?

Mr. BURR. Some of it comes down the Chagres, perhaps the majority of it, and there is the natural wash from the surface of the country.

The CHAIRMAN. Does any of it come from the Gatuncillo?

Mr. BURR. Some of it comes from the Gatuncillo.

The CHAIRMAN. Then your canal from Gatun goes practically up the right bank of the Chagres River to Bohio?

Mr. BURR. Yes; for some distance above Gatun.

The CHAIRMAN. About how far up; or does it cross the river frequently between Gatun and Bohio?

Mr. BURR. Between Gatun and Bohio it crosses and recrosses the Chagres. In fact, it makes a channel so much preferable for the Chagres that that river has availed itself of the excavations and flows mostly through it.

The CHAIRMAN. So that it is as near a straight line as you could there toward Bohio?

Mr. BURR. Yes.

The CHAIRMAN. That country between Bohio on the right bank of the Chagres River, is that a flat country?

Mr. BURR. It is mostly a low, flat country. There are some hills, little points projecting up, but it is largely a low, flat country.

The CHAIRMAN. Monkey Hill comes in there somewhere?

Mr. BURR. Monkey Hill is much nearer Colon; it is down near by the Mindi.

The CHAIRMAN. Now, the French plan was to divert the Chagres River to the right and to the left, to keep it out of the original bed, and they run their canal along the original bed of the river, as I understand it?

Mr. BURR. That is the French plan below the Bohio dam for perhaps 4 or 5 miles.

The CHAIRMAN. Up to the place you have selected for the dam at Bohio is the water at sea level?

Mr. BURR. In the Chagres river?

The CHAIRMAN. And in the canal, too.

Mr. BURR. Yes; practically at sea level after it leaves the Bohio locks.

The CHAIRMAN. Then it has to be dredged 35 feet below sea level there?

Mr. BURR. Yes.

The CHAIRMAN. So that when the tide comes into the bay of Colon it would be felt at Bohio?

Mr. BURR. Its influence or its effect at Bohio would not be sensible, because the extreme range of tide at Colon is less than a foot between high and low water.

The CHAIRMAN. But if there is any tide in the bay of Colon it would be felt at Bohio?

Mr. BURR. I doubt it; that is, to an extent that could be measured. There might be an infinitesimal wave up there.

The CHAIRMAN. In the plan of the Isthmian Canal Commission is that canal from Colon up to Bohio to be filled with sea water or with fresh water—Chagres water?

Mr. BURR. It would probably be a mixture of the two.

The CHAIRMAN. Is it not your purpose to keep the Chagres River entirely out of it, except what comes down through the locks?

Mr. BURR. It is; but those locks are large.

The CHAIRMAN. But the canal would stand full of water all the time, would it not, supplied from the sea?

Mr. BURR. The fresh water from the canal locks would be standing in there with it and it would dilute it. It would be brackish—more strongly sea water than fresh.

The CHAIRMAN. There would be 35 feet depth of water from the sea to Bohio, practically on the same level?

Mr. BURR. Yes.

The CHAIRMAN. When you get up to near the Bohio dam, where the dam is to be constructed, what is the character of the country right there at that point?

Mr. BURR. It begins to be hilly and broken; it is a bolder country; it rises.

The CHAIRMAN. At that spot the canal would keep the channel of the Chagres River as it is now, and something more perhaps?

Mr. BURR. Well, it would be in the lake above the dam, of course.

The CHAIRMAN. No, no; below the dam.

Mr. BURR. Below the dam it cuts across the channel and would be on the right bank.

The CHAIRMAN. The river would be on the right bank of the canal?

Mr. BURR. The canal on the right bank of the river. The location of the locks is such that the prolongation of the canal line beyond them cuts across the channel of the river and passes to the right bank after leaving the locks.

The CHAIRMAN. Now, in constructing the dam there at the point that you have selected would it be necessary to send back the water that comes from Colon or the water that is found in that canal?

Mr. BURR. Not for the completion of the foundation of the dam.

The CHAIRMAN. But the water would be present and would have to be dealt with all the time.

Mr. BURR. Yes; it creates a condition that must be dealt with by methods that are suitable.

The CHAIRMAN. So that in the construction of that dam you would have the water coming down from the Chagres River and you would also have the water in that canal below it?

Mr. BURR. Yes.

The CHAIRMAN. You would have to deal with both?

Mr. BURR. When we are building the upper part of the dam that is above the natural surface of the dam, there would be a temporary dam made above the permanent dam site.

The CHAIRMAN. What would be below? Would you make a temporary dam there to keep the water out that comes up through this canal?

Mr. BURR. No; we should not care anything about that below. The foundation of the dam would be constructed by methods which would enable us to deal with the situation without touching the water at all either above or below, but as soon as that part of the dam which is above the present water level of the Chagres is undertaken, then we must keep the water out of the present channel, at the point where the dam is constructed. It would flow through the present excavation for the locks. That would enable the superstructure of the dam to be carried up, it being all above the natural surface of the water in the Chagres River, so that the water flowing through the lock excavation and into the channel of the Chagres below the dam would not affect the work on the dam, it would have no effect upon the water level in the river; the water level in the channel of the river would be where it is now.

There might be needed some light channel works, perhaps, to keep the waste water from running back over the earth toward the dam, but we should not care anything about the water in the channel of the Chagres below the dam. All that we want to do is to keep it from running over the unfinished surface of work while progress is being made.

The CHAIRMAN. Well, in excavating for the foundation of the dam beneath the bed of the present river and also at other places in that geological valley there you would have to keep the water out of that excavation while you were carrying it down, would you not?

Mr. BURR. Not when employing what is called the pneumatic process.

The CHAIRMAN. That is the point I want to get at. Then, all the work of that dam beneath the present water level would have to be done by the pneumatic process or by caissons built on top of pneumatic chambers?

Mr. BURR. Yes; or by some other method that would accomplish the same purpose.

The CHAIRMAN. But all of it would be work under water or in the water?

Mr. BURR. It would be below the water.

The CHAIRMAN. Well, you spoke to-day about controlling the pressure there by pumps.

Mr. BURR. Yes.

The CHAIRMAN. Would those pumps have to handle all the water that comes against the lower base of this dam through the canal?

Mr. BURR. No. That is one alternative for dealing with the situation, a feasible alternative. The situation where it is proposed to locate this dam is a peculiar one. The channel of the river is narrow at that point. I can not give you the width, but perhaps about 100 feet, a little more or less. The banks of the river are very abrupt; on the right or easterly bank there is rock. That side of the channel is rock washed clean, running up to an elevation perhaps of 30 or 40 feet above the present surface of the Chagres River.

On the other side there is an equally abrupt bank, indeed perhaps

more so, but not of rock. It is of clay and sand, mostly clay, a very stiff clay, so that it stands with a face as steep as that of the rock on the other side. The river flows through this channel, which is rock on one side (on the right-hand bank) and clay on the other, until we get below the surface, then it is clay and sand, and it is the intersection of those surfaces which forms the river channel. This clay bank is 30 or 40 feet higher than the water surface in the river, and there is a plateau at the top of the left bank running clear back to the rock in which the excavation for the locks is made. The deepest part of this foundation for the dam is not underneath the water in this channel, but is underneath this clay and sand plateau.

The CHAIRMAN. Is that on the right or the left bank?

Mr. BURR. The left, or westerly bank. The proper method to construct that dam is not to disturb the river at all until it is imperative to do so. Five-sixths, and I do not know but more, of the dam foundation and the dam superstructure can be built complete, if it is so desired, without disturbing the river at all. If we excavate in that plateau, when about sea level is reached, we come to sand and clay which is more or less pervious to water, and if a pit was excavated it would fill with water up to sea level, or the level of the water in the Chagres. If we pump water from such an excavation, we can pump it out much faster than it will run in through this bed of clay and sand. That is a matter of common engineering experience. I have had it myself within two months. Just how far down a pump of reasonable capacity would keep a pit clear we can not state until we try it, but we do know that under just those circumstances the level of water has been kept down 15 or 20 feet without any trouble, and I have not the slightest doubt, from my experience with that kind of material, that the water can be kept down 30 or 40 feet below its level in the river at the dam site, because it is shut out from the river; there is no direct connection between the river and this pit. The only water that can come into the latter is that which seeps through the sand and clay, and if that sand and clay were perfectly impervious, we should go clear to the rock bottom in the dry; but that is not the case. Water will flow in to some extent.

By pumping in pits in this manner we can keep the water down 30 or 40 feet, and possibly more, below its normal level, so that instead of having 128 feet depth of water to deal with at the deepest point we should have 128 feet less 30 or 40 feet, which would bring the deepest part of the foundations well within the limits of depth which have already been reached by the pneumatic process.

The CHAIRMAN. All of this statement, as I understand you, relates to the excavations to the right and left of the current of the river.

Mr. BURR. To the left only. On the right it is solid rock, so that there would be no occasion for excavating there at all. I have forgotten just what the depth of rock is on the left margin of the actual water in the channel, but I think it is about 80 feet. It may be 90 or 95.

The CHAIRMAN. When you come to excavate in the bed of the river itself and below the bed of the river, then how do you deal with the water?

Mr. BURR. I should deal with the water without any attempt to pump it, but simply sink the pneumatic caisson just as we do everywhere in water. It would be necessary to carry those caissons down only 80 or 90 feet, which is within easy limits of depths.

The CHAIRMAN. At that point the rocks would appear within 80 or 90 feet of the surface of the water.

Mr. BURR. Yes.

Senator KITTREDGE. And on the right bank of the Chagres, at the point you expect to construct this dam, what is the depth of the rock below the surface?

Mr. BURR. None; it comes up to the surface and rises 30 or 40 feet above the water.

Senator KITTREDGE. Do you know the distance of the rock below the surface of the water, say 100 feet from the right bank?

Mr. BURR. Yes, we have that. That appears in our plan. That is the depth to which I referred a moment ago as being 80 or 90 feet.

The CHAIRMAN. Let us see if I understand the shape of the line on which the bottom of the dam is to rest. Commencing at the bluff on the right bank of the Chagres River, you go directly across the river and go into this clay bank on the other side—the left side—and you proceed with the foundations of your dam on the rock until that rock crops out?

Mr. BURR. Yes.

The CHAIRMAN. And in that way you propose to close the entire valley?

Mr. BURR. That is it.

The CHAIRMAN. Now, you made borings below this rock, further down the river?

Mr. BURR. Yes, we made a great many borings near that vicinity.

The CHAIRMAN. Do you remember whether in the borings you made below the dam site you found places where you did not go to rock?

Mr. BURR. I think there were some borings that did not go to rock, below. There were some above. At other locations the deepest rock was deeper than 128 feet.

The CHAIRMAN. Were the borings deeper above or below this site?

Mr. BURR. They were deeper both above and below. The rock surface of that geological valley, as we call it in the report, is exceedingly irregular. It is not at all impossible—in fact, I do not know that it is improbable—that by further borings one may find a more favorable location for a dam than this one.

The CHAIRMAN. It is equally possible or probable that a greater number of borings made on the dam site may disclose that you have not got a firm rock bottom.

Mr. BURR. It is possible there may be a small pocket on that line. That is true, but with the number of borings that were made it is not probable that there would be enough in that to affect sensibly the plan of operation.

The CHAIRMAN. What was the distance between the borings there on the dam site?

Mr. BURR. I can not recall that. Some of them were nearer together than others. I think the longest distance was something like 150 to 200 feet.

The CHAIRMAN. And the nearest distance?

Mr. BURR. The nearest distance may have been 50 to 100 feet; I do not give those as exact figures.

The CHAIRMAN. You speak of the geological valley there.

Mr. BURR. In the rock, yes.

The CHAIRMAN. It is that, isn't it?

Mr. BURR. We call it so.

The CHAIRMAN. That is your opinion as a geologist and as a submarine man?

Mr. BURR. It is a valley in the rock which apparently was an old river bed.

The CHAIRMAN. Or a sea bed?

Mr. BURR. Well, scarcely I, think a sea bed, but more likely a river bed; but still that is like all geological speculations; it is not capable of mathematical demonstration.

The CHAIRMAN. I know; but I supposed your borings would reveal to you something about that and about the dip of the geological valley, whether to the south, north, east, or west, than what the degree was.

Mr. BURR. The irregularity of the bottom is such that it is a very unsafe thing to attempt to speculate about the situation beyond the limits of actual examinations. We put down borings there to get the general shape of things within the limits of those farthest upstream and those farthest downstream. We know pretty well what there is between these sections, and what there is outside of that nobody can state with certainty. That country is an exceedingly difficult one to deal with in a speculative way.

The CHAIRMAN. Would you say the dip of that valley was toward the Caribbean Sea or toward the Pacific Ocean?

Mr. BURR. It can not be told from our results. The location which we selected was the highest surface of rock which we found. We found it also on both sides, both upstream and downstream. Now, what the general trend is we can not state with certainty. I imagine that the general trend is downward, toward the Caribbean Sea.

The CHAIRMAN. Yes; the mountains there of course decline in that direction.

Mr. BURR. Yes.

The CHAIRMAN. What is your classification of the rock you found at the bottom of Bohio Dam?

Mr. BURR. We had no specimen of rock.

The CHAIRMAN. You had the cores that you bored out.

Mr. BURR. We had no rock core. We went to the rock and stopped; we did not bore into the rock. We made no diamond drill boring on the Panama line; we made many diamond drill borings on the Nicaragua line.

The CHAIRMAN. You could not ascertain anything about the composition of rock without a diamond drill?

Mr. BURR. Not fully.

The CHAIRMAN. What kind of borings did you make?

Mr. BURR. What are called jet borings, but aided with small charges of dynamite whenever the pipes came to an obstruction, so that we were positive that we reached bed rock.

The CHAIRMAN. I know, but as to the characteristics of the rock you did not get any actual information?

Mr. BURR. No; not from the borings, but the rock was continuous with that on the right bank.

Mr. CHAIRMAN. What is that?

Mr. BURR. It is a kind of sandstone, which changes in some places into almost a basaltic rock. At Bohio there are quarries of rock. It is a kind of soft rock which is as near sandstone as anything, but when

we get down to the river it is harder. In places it is an igneous rock of some kind, more like basalt; and further on toward Panama, as at Obispo and Pedro Miguel, it is actual basalt.

The CHAIRMAN. That means rock of volcanic origin?

Mr. BURR. Yes; that whole country is volcanic; it is topsy-turvy in its physical make up.

The CHAIRMAN. Did you examine the rock brought out of the test pits in the Culebra cut?

Mr. BURR. Yes.

The CHAIRMAN. How do those specimens there compare with the rock you touched with your borings at Bohio?

Mr. BURR. They do not compare at all. It is entirely different. It is not rock in the Culebra cut, though it is to be classed as soft rock; that is, it may properly be so classed for the purpose of excavation, because it lies there so solid as to necessitate blasting, but it is a kind of partially indurated clay. If you take a piece of it, as we did many times, even the hardest of it, and put it in a glass of water, it will commence to disintegrate and go to pieces within two or three minutes. But the Bohio rock will not. That is rock.

The CHAIRMAN. That resists the water and the action of atmosphere?

Mr. BURR. Yes.

Mr. CHAIRMAN. I suppose the Culebra rock we call it, is more amenable to atmospheric action than it is to water?

Mr. BURR. It stands well against the atmospheric action even with very steep faces, but, of course, it does weather some. It weathers more in some places than in others, but it is rather curious in this, that in these pits, in which two or three of the members went down, including myself, partially filled with water and down the sides of which water is constantly dripping, so that we were drenched, the material does not seem to disintegrate very rapidly. Of course it does disintegrate to some extent under that action, but it stands remarkably well. If you take a piece of that same clay standing within the the pit and put it into a glass of water, where the water can reach it on all sides, it goes to pieces completely in a very few minutes.

The CHAIRMAN. Now, we will get back to this geological valley, which you say may be, and probably is, the bed of a little stream there, either of sea water or fresh water.

Mr. BURR. Yes.

The CHAIRMAN. That had been filled up in places to the depth of 128 feet?

Mr. BURR. More in some places.

The CHAIRMAN. In going down through that depth you would strike various different strata?

Mr. BURR. Some clay, some sand, a mixture of sand and clay, some fine sand, some coarse sand, and some gravel.

The CHAIRMAN. And some decomposed vegetable matter?

Mr. BURR. No decomposed vegetable matter.

The CHAIRMAN. It was more solid than that?

Mr. BURR. Yes. No decomposed vegetable matter was disclosed.

The CHAIRMAN. You could not say there was any stratification of these different beds?

Mr. BURR. No regular stratification; exceedingly irregular.

The CHAIRMAN. Such as would be washed in by the drift of a stream filled up this basin in passing over it?

Mr. BURR. I do not think the simple wash of a stream would cause such irregularities. I think it would be much more regular.

Senator KITTREDGE. Beginning at the right bank, at the place you expect to construct the Bohio dam, you started with rock, and then it slopes under the bed of the river, under the plateau that you spoke of, down to the point where you struck the rock?

Mr. BURR. It comes up.

Senator KITTREDGE. I mean comes up. So that from the point where the locks are to be constructed on the Panama route clear across the plateau and across the Chagres River rock underlies the whole distance?

Mr. BURR. That is the situation.

Senator KITTREDGE. Beginning again at the right bank of the Chagres River, for 200 feet on the surface is the river, and then you come to the plateau, and that extends for what distance down to the place where the locks are constructed?

Mr. BURR. Perhaps 1,000 or 1,200 feet. That is along the surface of this plateau.

Senator KITTREDGE. Then you get into the rocky hill in which the Bohio locks are cut?

Mr. BURR. Yes.

Senator KITTREDGE. Then, as I understand, it is about 200 feet across the surface of the river at this point?

Mr. BURR. The actual surface is about 100 feet. I mention that from memory, but as an estimate I should not think that when we were there the actual surface of the water was even 100 feet.

Senator KITTREDGE. And under the water of the river proper the rock is at no point lower than about 80 or 90 feet?

Mr. BURR. Yes; about that.

The CHAIRMAN. As you go along from the Bohio dam upstream toward Obispo, does the canal follow the line of the river?

Mr. BURR. Very closely.

The CHAIRMAN. Would there be any actual canalization between Obispo and Bohio?

Mr. BURR. Yes; there would be canalization; it would be a canalization in the lake.

The CHAIRMAN. That is what I mean.

Mr. BURR. Yes; there is considerable cutting.

The CHAIRMAN. You would have to really construct a canal of greater or less depth between Bohio and Obispo?

Mr. BURR. Not all the way, but along the upper reaches. You see the line lies about 13 miles in Lake Bohio. The upper end of that 13 miles, perhaps for 5 or 6 miles, it would be necessary to cut in order to get the requisite depth of 35 feet at minimum water.

The CHAIRMAN. Then the water of the Chagres River would be backed up still beyond Obispo around in the direction of Alhajuela?

Mr. BURR. Yes; it backs up almost to Alhajuela.

The CHAIRMAN. But at less depth than it would be in Bohio?

Mr. BURR. A constantly diminishing depth as you ascend the river.

The CHAIRMAN. Is that river steep there?

Mr. BURR. Yes; it is, as rivers go, because in the dry season of the year, as when we were there, there are rapids, but up which the natives push their long canoes. Any river that has those features of rapids is steep as rivers go.

The CHAIRMAN. What is the natural elevation above Obispo?

Mr. BURR. About 85 feet above sea level is the elevation of this lake surface; at times a little more.

The CHAIRMAN. Then you leave the lake at Obispo?

Mr. BURR. Yes.

The CHAIRMAN. And go in the direction of Culebra?

Mr. BURR. The Emperador cut really begins at Obispo. The Emperador cut, as it is called, is the northern end of the great cut through the divide, and the southerly end is the Culebra, but they really constitute one cut.

The CHAIRMAN. There is a little stream that meanders along there at Obispo called the Obispo River.

Mr. BURR. Yes; I think it is. It is a very small stream.

The CHAIRMAN. You go up the valley on that?

Mr. BURR. Yes; I think it is called the Obispo River. It is a little thing. In fact, it has practically disappeared with the work that has been done.

The CHAIRMAN. Then, as I understand it, there is a sudden lift up on the ridge called the Culebra Ridge, right across the line of your progress—the line of the canal—of about 300 feet?

Mr. BURR. About 300 feet above sea level.

The CHAIRMAN. And you must get the water upon that ridge how high to get across to Obispo or Miraflores, or some of those locks?

Mr. BURR. By the Commission's plans 85 feet above sea level; that is, the mean level. It may rise in time of severe flood, severer than we have any record of, as high as 90 or 91 feet, perhaps, and it may fall as low as 81 or 82 feet.

The CHAIRMAN. What lock is it that holds that river in check from emptying into the Pacific Ocean?

Mr. BURR. The Pedro Miguel locks on the southerly face of the Culebra hill, so to speak.

The CHAIRMAN. And there you have a double flight of locks?

Mr. BURR. Yes.

The CHAIRMAN. Near that you have a tidal lock?

Mr. BURR. A tidal lock at Miraflores. It is a little more than a tidal lock, because the elevation between Pedro Miguel and Miraflores lock is a little above sea level, perhaps 15 feet.

The CHAIRMAN. It is a tidal lock with that added?

Mr. BURR. Yes.

The CHAIRMAN. And then from there; after you get into the tidal lock, you pass out into the sea about how many miles before you reach the coast line?

Mr. BURR. It is about 6 miles to the coast line, and then there is a cut in that channel of 2 miles or more before reaching deep water.

The CHAIRMAN. You do not state that as accurate, do you?

Mr. BURR. No; but it is about that. Perhaps I can find it in the report. The superelevation of the Miraflores lock is 18 feet, not 15; that is, it is a tidal lock with 18 feet added.

Senator KITTREDGE. What are the dimensions of the Pedro Miguel lock?

Mr. BURR. All the locks are of the same dimensions. The lift varies from 54 to 62 feet, which is divided between the two lifts. Instead of being 6 miles, it is 4.5 from the Miraflores lock. That is a little inside of the shore line where the pier is located called La Boca,

and from that to deep water is 4.41 miles to the 6-fathom line in Panama Bay, making about 8½ miles from the Miraflores lock to the 6-fathom line in Panama Bay.

The CHAIRMAN. Did you make any borings in the channel out into the Bay of Panama?

Mr. BURR. We made no borings there. The work of dredging is going on there all the while, and the information as to the bottom is complete without borings. The work of dredging was going on while we were there.

The CHAIRMAN. Dredging in the bay?

Mr. BURR. Yes.

Senator KITTREDGE. Under whose direction?

Mr. BURR. The New Panama Canal Company.

The CHAIRMAN. What are they dredging there for?

Mr. BURR. To get a channel into La Boca pier.

The CHAIRMAN. They are building there; they are not keeping open what they have dredged?

Mr. BURR. The New Panama Canal Company is under certain engagements to give deep water to all vessels that need it entering Panama Bay. They desire a pier for the purpose of railroad connection with deep-draft ships, and the Panama Railroad Company built this pier, although it was practically a Panama Canal Company's enterprise. There was shallow water between this pier at La Boca and the deep water of the harbor, so that in order to complete their engagement with the Colombian Government as to this deep-water facility they were obliged to excavate the channel between La Boca and the deep water of Panama Bay.

The CHAIRMAN. That is as far as they have dug in the direction of Miraflores, is it not?

Mr. BURR. They have not dug to Miraflores.

The CHAIRMAN. I mean in that direction; they have dug to the coast line, haven't they?

Mr. BURR. They have excavated a good deal of the canal prism, between Miraflores and the shore line, but it is all shallow. There can be no deep water for navigation there until further excavation is made; but from the shore line where this pier is located out into Panama Bay, they now have deep water of 30 feet, I think, or about that.

The CHAIRMAN. I observe on one of the charts that are here that they had formed an embankment—a spit—of sand, as you describe it, across the mouth of the canal where it had been dredged between Miraflores and deep water. I mean near the coast line. Do you remember seeing that?

Mr. BURR. No; I do not think there is any special sand spit formed there. The wash down the Rio Grande River, as it is called (a small stream, however, except in the rainy season), has brought some sand and silt naturally down the canal excavation, because the canal excavation runs along that river between Miraflores and La Boca pier, so far as the canal prism has been excavated. We steamed up there in a tug, two or three miles toward Miraflores from La Boca. It was shallow water, and we made the trip with a tug of light draft.

The CHAIRMAN. It had been dug out to the depth of the canal prism previously?

Mr. BURR. Not to the full depth.

The CHAIRMAN. Or nearly so?

Mr. BURR. Only in the vicinity of La Boca; they may have cut it the full depth there.

The CHAIRMAN. And then on toward Miraflores more or less?

Mr. BURR. More or less.

The CHAIRMAN. And they have thrown out the banks on either side?

Mr. BURR. To some extent, though not very much there.

The CHAIRMAN. Had the banks disappeared from that part?

Mr. BURR. There had not been so very much excavation made. It did not require very much to give them the water which we had; some of it had been dumped on the banks, however.

The CHAIRMAN. You found very little embankment on either side of the canal?

Mr. BURR. Not much, because there was not much to make it with. Toward La Boca there had been some material dumped, and the usual result of dumping on soft ground had resulted—that is, the bank had gone down and the soft material on either side had risen a little.

The CHAIRMAN. The bank had sunk.

Mr. BURR. Yes, slightly.

The CHAIRMAN. Is there not country of that kind that will have to be provided for between Bohio and Gatun or between Gatun and Colon?

Mr. BURR. No; nothing so soft as that between Bohio and Gatun.

The CHAIRMAN. From Gatun to Colon?

Mr. BURR. From Gatun to Colon there is some material nearly as soft as that; but it is not so soft a country, nothing like it.

The CHAIRMAN. But it requires strong embankments made of material that must be brought from some other place and put there in order to protect that canal from the invasion of running water, the swells in the adjacent streams.

Mr. BURR. Oh, no; it would not be necessary to bring material from other places. I think the material that is taken out of the canal will make all the embankment necessary.

The CHAIRMAN. It has not done it up to date; they have disappeared, we understand, largely.

Mr. BURR. Oh, no; there is only the natural wash. In fact, material which is thrown out upon the bank will be covered by vegetation in a very short time. While there is some wash, there is not very much. A bank that is made in that tropical country will, if it is formed at the beginning of a rainy season, wash some; but if it is made at the beginning of a dry season it will, I should say, in almost all cases be covered with vegetation before another wet season comes around.

The CHAIRMAN. There is a tide through the bay of Panama of how many feet?

Mr. BURR. The range of tide in Panama Bay is 20 feet, between high and low.

The CHAIRMAN. That occurs every twelve hours or every twenty-four?

Mr. BURR. Two tides in a day.

The CHAIRMAN. Twice in twenty-four hours there is 20 feet of water superimposed on the canal line, lying in that bay, and that would make 55 feet of water if you dig it 35 feet deep?

Mr. BURR. Yes.

The CHAIRMAN. Is there no difficulty of navigation through that mass of water when the winds are a little out of order?

Mr. BURR. No; there is no difficulty in navigating that.

The CHAIRMAN. Why is there not? How do you escape it?

Mr. BURR. The steam power or motive power of a vessel is what is required——

The CHAIRMAN. To keep it straight? To keep the vessel straight?

Mr. BURR. To manipulate your vessel and make it go where you want it to. There is no trouble in the Bay of Fundy, for instance.

The CHAIRMAN. How wide a channel along that route of $4\frac{1}{2}$ miles would be necessary in order to protect a vessel against running against a coral on either side of the cut?

Mr. BURR. There is no coral there.

The CHAIRMAN. Do you state that as a matter of absolute fact?

Mr. BURR. There is no coral between Miraflores and La Boca.

The CHAIRMAN. No, no; between La Boca and the anchorage.

Mr. BURR. I misunderstood you. There is rock, considerable rock, that would have to be excavated in the channel to make a channel.

The CHAIRMAN. What width of channel do you provide for out there?

Mr. BURR. A dredged channel 200 feet wide with slopes of 1 on 3 will extend from La Boca 4.41 to the 6-fathom line in Panama Bay. The first 2 miles of this dredged channel are through flats which are bare at low water, where there is a considerable amount of submerged rock. The total cost of this section from the locks to deep water is estimated at \$12,427,971, of which \$1,464,513 is for work outside of La Boca. The cost of maintenance of this channel is included in that of the canal. Considerable rock has been excavated there already.

The CHAIRMAN. In that channel?

Mr. BURR. In that channel.

The CHAIRMAN. Outside of La Boca?

Mr. BURR. And at La Boca. I do not know how much rock has been excavated between La Boca and deep water, but at La Boca considerable rock has been taken out. It was being taken out when we were there.

The CHAIRMAN. Is that a coral rock?

Mr. BURR. No; it is not a coral rock. I can not tell you exactly what it is; I should say that it was igneous rock.

The CHAIRMAN. Probably of volcanic production?

Mr. BURR. Yes; like all the rest of that country.

The CHAIRMAN. And beyond that, through it, and about it there is coral rock?

Mr. BURR. Well, there may be somewhere in Panama Bay coral rock. I can not say, but I do not believe that there is coral rock in that channel.

The CHAIRMAN. Well, coral rock is usually deposited in sheets or plateaus, is it not?

Mr. BURR. Usually.

The CHAIRMAN. When you come across coral, you expect to find it as far out to sea as they have built it?

Mr. BURR. Yes.

The CHAIRMAN. And you find it uniform and solid as they make it throughout?

Mr. BURR. All the rock in sight along the canal line is a volcanic rock.

The CHAIRMAN. Now, we will go back to the part of the river below Bohio. I understand that all of the water that passes the Gigante spillway goes down into the swamp called Pena Blanca, and then through that into another swamp, and then through that down back, and would go into the Chagres River again but for the fact that it is to be channeled off.

Mr. BURR. It will go into the Chagres River again and run through that channel for a comparatively short distance before it enters the sea, and that flood water will at some point run alongside of the levees which form the left bank, going toward Colon, of the canal.

The CHAIRMAN. Well, your purpose is to divert the entire waters of the Chagres River that escape over the spillway?

Mr. BURR. Yes.

The CHAIRMAN. Out of the canal channel and carry it off out to sea through the original channel of the Chagres River?

Mr. BURR. Yes.

The CHAIRMAN. That enters into the sea at Las Cruces?

Mr. BURR. No, sir; that is away up the river. It enters into the sea at, I think, Chagres.

The CHAIRMAN. I knew there was a Las Cruces below Alhajuela, between that and Bohio, but I understood it was Las Cruces.

Mr. BURR. It is no matter; it is the point at the mouth of the river, wherever it is.

The CHAIRMAN. That is very heavy work, is it not, channeling off that river, preventing it from going into the canal?

Mr. BURR. No.

The CHAIRMAN. You have a prism there two or three times the width of the canal for taking off that water.

Mr. BURR. Well, the fact of the matter is, those floods, whenever they occur, which would be rare, will flow all over that flat country.

The CHAIRMAN. You do not mean that they will flow over the canal?

Mr. BURR. Oh, no; they can not.

The CHAIRMAN. But at Gatun they go back into the river and pass around the point of a hill, I understand, that you have to cut away?

Mr. BURR. No; it is below Gatun. Unfortunately, we haven't got a map here. It is a little below.

The CHAIRMAN. On the left bank of the canal?

Mr. BURR. Yes, sir.

The CHAIRMAN. There you have to go through a hill to make this channel way to get these Chagres waters out of the route of the canal?

Mr. BURR. Yes.

The CHAIRMAN. So that you commence your embankment at the left bank of the canal at that point and extend it into Colon?

Mr. BURR. No; not all the way into Colon, because it is only needed for a comparatively short distance—3 or 4 miles possibly.

The CHAIRMAN. And on the right bank of the canal you also have an embankment for the purpose of fencing off the waters of the Gatuncillo?

Mr. BURR. The easiest way to manage the waters of the Gatuncillo now is to use a channel which the Frenchmen have already cut for that purpose, and carry that water down into the bay on the opposite side of Colon from the harbor.

The CHAIRMAN. That is to say, on the eastern side?

Mr. BURR. On the eastern side.

The CHAIRMAN. And then you would have, in order to get rid of the water at the Gatuncillo and this other little river that you mention—the Mindi—you would collect the waters into one channel and carry them into Colon Harbor to the eastward of Colon?

Mr. BURR. To the eastward of Colon, yes; it is not in Colon Harbor. I forget what it is called.

The CHAIRMAN. It is continuous away around?

Mr. BURR. Yes; Colon is really on an island.

The CHAIRMAN. Now, that channel on the right-hand side of the canal, as you go to Colon, would have to be a large channel?

Mr. BURR. Not a very large one. It is already constructed; I do not recall the dimensions.

The CHAIRMAN. It will have to be widened?

Mr. BURR. I think not; but if there is any work to be done at all, it is very simple; it is practically completed already. The Gatuncillo and the Mindi are both small rivers, and even in flood stages they do not amount to much; but still they can be cared for in that way very readily.

The CHAIRMAN. I want to call your attention to something that no doubt you have examined carefully. It is the paper proposed by Mr. Morison that he submitted to the American Society of Civil Engineers for discussion in March, I believe.

Mr. BURR. I have not read that paper, but I saw it before he put it in print, and I know about what it is; in fact, I know exactly what it is.

The CHAIRMAN. He states on page 12 of his paper in regard to the Bohio dam:

“There can be little doubt that a dam of this character could be built; it involves novel and untried features, and few engineers, even among those who feel they could construct it, would be ready to say in advance how this work should be done. The difficulties, taken in connection with the climate and other surroundings, are enormous.”

Now, do you think he is mistaken in that statement?

Mr. BURR. I do; we have not agreed on that point.

The CHAIRMAN. In what respect is he mistaken in that statement, in your opinion?

Mr. BURR. He says that it involves novel and untried features. I do not know where they are or what they are.

The CHAIRMAN. One of them you have stated to-day, and that is, that no experiment had as yet been conducted successfully, or even attempted, at 128 feet below the water level for pneumatic excavation.

Mr. BURR. The pneumatic excavation would not be made under that depth of water.

The CHAIRMAN. I understand your explanation of it—by pumping you could reduce the pressure to 100 feet.

Mr. BURR. Something like that.

The CHAIRMAN. I do not think that you have explained how that could be done when you struck the bed of the river.

Mr. BURR. We do not need to do it there; the rock is not sufficiently deep to require it.

Senator KITTREDGE. The rock there is 80 to 90 feet?

Mr. BURR. Something like that. I do not give those as the exact figures, but it is about that. The pneumatic process has been used to a depth of somewhat over 115 feet. That has been done on more occasions than one.

The CHAIRMAN. On this continent?

Mr. BURR. Yes; very recently. One case was that of the foundations of the new East River Bridge. They were carried down to a depth of about 115 feet, and the greatest depth under the Eads Bridge at St. Louis approaches very closely if it does not equal that.

The CHAIRMAN. There is quite a difference between the building of a dam under water and a bridge pier.

Mr. BURR. No; the same thing in both cases.

The CHAIRMAN. It depends on the size of the pneumatic caissons?

Mr. BURR. To some extent, but not altogether. We use such size of caisson as the work may require, and in engineering, as in all other things, we keep growing a little larger in things that we do; that is, we increase facilities that enable us to go a little farther or do a little more than we have done before.

The CHAIRMAN. At a depth of 110 or 115 feet, how long could a man work in a caisson?

Mr. BURR. Not long; perhaps three-quarters of an hour.

The CHAIRMAN. That, of course, would be a very expensive way; because you would have to have relays of men every three-quarters of an hour.

Mr. BURR. It would be expensive.

The CHAIRMAN. It would require a large number of men to work in these caissons to keep the work in proper progress?

Mr. BURR. Not a very large number. It depends upon how many caissons are going on at the same time.

The CHAIRMAN. It is very slow work and requires skilled labor?

Mr. BURR. No; not skilled labor.

The CHAIRMAN. To manage the valves and the doors, and to keep the balance of pressure?

Mr. BURR. The class of laborers that do that work I think can scarcely be called skilled; in fact, they are called sand hogs, which does not indicate a very high order of individuals. They are men who have become accustomed to work in compressed air, and some of them are mechanics, perhaps, but it can not be said that they are skilled laborers.

The CHAIRMAN. I thought in managing the doors to regulate the pressure away down at that depth, and in elevating material, it would be necessary to have men who had a good deal of skill.

Mr. BURR. No; that operation is very simple—the management of the doors and the valves. The foremen and the superintendent of such work, of course, must be men who have had experience and they must watch matters closely. Wherever elevators are used to take men up and down, the machinery required for that purpose (all of which would be outside in the open air) would require skilled attendants to operate, but the actual excavation under air pressure and the management of the air locks requires no special skill. It requires care.

The CHAIRMAN. The caisson would be built, of course, of steel?

Mr. BURR. It may be built of steel or of timber.

The CHAIRMAN. Is it very carefully built?

Mr. BURR. Strongly built.

The CHAIRMAN. Strongly built and carefully built?

Mr. BURR. Very strongly built and carefully built.

The CHAIRMAN. Made air-tight and water-tight?

Mr. BURR. Made air-tight and water-tight, as near as they can be made.

The CHAIRMAN. So that the adjustment of the doors and walls would have to be nicely provided for?

Mr. BURR. Very nicely provided for. Still, it is not anything like so fine a grade of work as is required in ordinary railroad machinery: for instance, or machine-shop machinery.

The CHAIRMAN. I do not suppose that; of course, it could not be.

Mr. BURR. It is a class of work when built of steel like railroad bridge work.

The CHAIRMAN. What are about the dimensions of the caissons you would use in building this dam; what have you provided for in your estimates?

Mr. BURR. They are not large caissons; they are rather small, as those things go nowadays. It would depend on how long you desire to make them. I suppose they would be, perhaps, 36 feet by as long as they could be handled—36 by 100 or 120 feet. Much larger caissons are being used at the present time.

The CHAIRMAN. One hundred and fifty feet long?

Mr. BURR. Yes; from 100 to 120 feet long, and 36 feet in the other dimension.

The CHAIRMAN. So that the lengthwise would be on the floor of the dam?

Mr. BURR. The longest dimension of the caisson would be along the center line of the dam, and the other dimensions would be at right angles to the center line of the dam, because the masonry for which this pneumatic caisson would be the foundation is only a comparatively thin wall, 30 feet thick at the bottom, as proposed, and all outside of that is a vast mass of embankment fill on either side.

The CHAIRMAN. Unless you dredge the bottom of this dam in the rock so as to get the caisson set down on the level, how would you provide for keeping the water from passing underneath it?

Mr. BURR. There are various expedients which can be resorted to without taking these caissons clear to rock. The character of those expedients would depend upon what is found. This dam would not be built until additional borings were made so as to determine more completely just what location is most favorable. Such a procedure would be advisable for the detailed design of the caisson and for the determination of all questions connected with its sinking. These additional borings are not needed for an estimate, but for the actual construction of the details of the dam and its foundations they would be needed. After having secured that information conclusions could be reached as to expedients that might be required in case the caissons were not carried completely to bed rock.

It is quite possible when a caisson has been brought down within perhaps 10 to 20 feet of bed rock to put in what we call sheet piling on either side of the caisson, so as to make a continuous sheet or curtain extending from the bottom of the caisson down to the rock, and so cut off any possible flow of water underneath it. I have done that myself in caisson work, not to the depth of 20 feet, but I have done it to the depth of 6 or 8 feet, and could easily have carried it farther if there had been any occasion to do so.

The CHAIRMAN. Then you build a cofferdam around the bottom of the caisson?

Mr. BURR. Yes; but under air pressure, extending from the lower edge of the caisson to rock. That makes a complete sheet on both sides of the caisson and shuts off all possibility of flow of water underneath.

The CHAIRMAN. You say both sides. There are four sides to the caisson.

Mr. BURR. Yes; but it is only the upstream side and the downstream side that would have to be provided for in this case. The sheeting could extend around the four sides if desired. In fact that is what I have done in the cases mentioned, because there was an isolated caisson. Or, having gone down to that depth, it is possible to freeze the material solid below the caisson and then excavate it in the dry. The freezing process has not been completely successful as yet in this country, or, rather, it has not been commercially successful; that is, it costs too much, but it has been used in Europe and it is perfectly feasible to use it in this case if its use should be found desirable.

The CHAIRMAN. The freezing process has never been successfully used except in very small works.

Mr. BURR. Yes; it has been used in an iron mine in Michigan where a shaft was sunk, but it cost a good deal to do it; yet the work was done successfully and it can be done for less money at another time because of the experience first gained.

The CHAIRMAN. That is a shaft sunk through water?

Mr. BURR. No; it was through sand and various water-bearing materials.

The CHAIRMAN. And in order to get from one ledge of ore to another?

Mr. BURR. No; there the idea was to sink a shaft down to the rock and complete it, so that excavations could be made either horizontally or below. They wanted to cut off the water around the shaft and they froze it.

The CHAIRMAN. You would not like to undertake to freeze the Chagres River in a torrid climate, would you?

Mr. BURR. I should not object to attempting to freeze it at the bottom of this excavation, 128 feet below the surface; it would be a very suitable place to apply the process, but I don't think it would be necessary.

The CHAIRMAN. Between the point at which we have arrived by actual borings, the ascertainment of actual facts, and the point to be arrived at of the manner of locating that dam on base rock, there seems to be quite an extensive field that is left to conjecture or to engineering contrivance, as I understand it.

Mr. BURR. I don't think there is anything left open, or in doubt.

The CHAIRMAN. Well, there is the point that no successful work has ever been done as yet at 128 feet below sea level.

Mr. BURR. A great deal of work has been done successfully at far greater depths than that, but the pneumatic process has not been used under a 128-foot head of water; but it has been used under a head of 115 feet of water. Now, the situation there is such that it would not be necessary to use the pneumatic process under a greater head than 100 feet of water.

The CHAIRMAN. What is the name of the processes by which a far greater depth than 128 feet has been obtained?

Mr. BURR. Mining operations.

The CHAIRMAN. But that is through the earth. I am speaking of pneumatic work through water. I mean sinking a pier or a bridge section into the water, and through the water down to base rock.

Mr. BURR. The pneumatic process, as I have just stated, has not been used under a 128-foot head of water, but it is not necessary to use it under that head.

The CHAIRMAN. You go back to the proposition that you can pump it out to 100?

Mr. BURR. Yes; I have no doubt of it.

The CHAIRMAN. I think you made no allowance for the influx of tide water from Colon Bay?

Mr. BURR. Yes; I made an allowance for any water that may be found there and for any water that may find its way in through the sand. There is nothing new about pumping a head of water down in that way. It has been done a great many times.

The CHAIRMAN. I suppose it is quite an expensive process?

Mr. BURR. No; not necessarily.

The CHAIRMAN. It reminds me—I do not know whether it is analogous or not—of the proposition of the French engineers to fill the canal with pumps.

Mr. BURR. That is quite a feasible proposition, but it is not necessary. We are constantly raising enormous quantities of water for city water supply.

The CHAIRMAN. Would you feel safe as an engineer to fill up the canal and keep it filled for ships with pumps?

Mr. BURR. I should prefer to have it come in by gravity, but knowing that the quantity to be supplied would be 1,100 cubic feet per second, for instance, it is perfectly feasible to supply that with pumps.

The CHAIRMAN. Do you fall in with Mr. Morison's plan about the availability and safety of an earth dam there, with the riprap or broken-rock frontage?

Mr. BURR. Such a dam might be satisfactory. I should not care, however, to design such a dam and construct it for that purpose without more information as to the impermeability of the substrata material than we yet possess. We have sufficient information to enable us to make a confident estimate of the cost of a secure dam on the plan proposed by the Commission, but I do not regard the proposition of Mr. Morison as a safe one on which to make estimates and predicate security at the present time.

The CHAIRMAN. Well, Mr. Morison is a great engineer, is he not?

Mr. BURR. He is.

The CHAIRMAN. But great engineers, particularly, differ.

Mr. BURR. Great engineers, like other great men, may be mistaken sometimes.

The CHAIRMAN. Yes, and are very apt to differ.

Mr. BURR. And they sometimes differ.

The CHAIRMAN. Now, you have got a 90-foot head of water there, as I understand it, or what is the head of water when that dam is completed?

Mr. BURR. The ordinary height would be 85 feet above sea level. It may run to 90 or 91 and may fall to 81 or 82.

The CHAIRMAN. Suppose you had permeable material at the base of the dam through that geological valley there, with a 90-foot head of water or an 85-foot head of water, would you expect to find merely seepage under that dam, or would you expect to find it was undermined?

Mr. BURR. There might be only seepage. I am inclined to think there would be only seepage, but I should not consider it judicious to risk that.

The CHAIRMAN. What would prevent it from being undermined?

Mr. BURR. The base of the dam which he proposes is very wide. I have forgotten how wide.

The CHAIRMAN. I am speaking about such a dam as you were going to put down there.

Mr. BURR. Oh, I did not understand you.

The CHAIRMAN. With 80 or 95 feet head of water there, if it comes in contact with permeable material that you have left under the bottom of your dam because you could not get down to the bottom of the rock—suppose that case, this great massive stone dam—would you expect such a head of water as that to content itself with forcing a seepage, or would you expect it to push a current under there that would undermine your dam?

Mr. BURR. That is not the plan of the Commission.

The CHAIRMAN. I am just providing for a case of your not having a foundation and bottom.

Mr. BURR. Well, that goes beyond the limits of legitimate speculation. We should find a bottom; we should have to find a bottom.

The CHAIRMAN. Suppose when you come to build this dam you found, in these intervals of 50 or 100 or 200 feet, gashes, I will call them, in the bottom of this geological valley, filled up with permeable matter, what would you expect would be the result of a 90-foot head of water upon that permeable material under the bottom of your stone dam?

Mr. BURR. If they were small gashes such as you describe, I should expect that the water would simply seep through. There would be no chance to displace so small an amount of material with so great an amount of quiescent material around it; but that is the supposition which we should avoid at the start.

The CHAIRMAN. Well, but we are trying to find out now—we want to put up the money on the facts that exist and that you know to exist, and not those that may be conjectural—and the question is if you don't know that that bottom is entirely uniform of rock across that geological valley, whether we are safe in appropriating \$100,000,000 or \$200,000,000 for the purpose of making this canal, to which that is the absolute key.

Mr. BURR. I have not the slightest doubt of safety in providing that amount of money for the purpose.

The CHAIRMAN. I know you haven't got any doubt of it, but I want to know if you have any facts, beyond those mentioned as stated in the report, that justify you in that opinion.

Mr. BURR. We have made known all the facts that we have, Mr. Chairman.

The CHAIRMAN. That is what I supposed, but there is still a margin of unknown facts, which you in recommending the Panama Canal Company route—which are conjectural; they are not known.

Mr. BURR. No; I do not admit that.

The CHAIRMAN. Can you state any facts—

Mr. BURR. They are known within just as narrow limits as any engineering facts are ever known on which estimates for such work are based. Of course, there is an opportunity to say that in the absence of an actual, continuous line of rock surface from one end of the structure to the other, that we do not know just what shape that line may show. That is true of the Nicaragua route, and it is true of the Panama route. It is true of every engineering work that was ever accomplished before the work was actually done; but there are certain reasonable limits within which engineers are, I think, legitimately

permitted to base reasonable predictions on sufficient information, and I believe we have just that degree of information at Bohio. I believe, further, that additional information, such as should be obtained before the actual work of construction is done, will give us an even more favorable location than we have found there. That prediction rests upon the fact established by engineering experience that examinations along a comparatively few sections do not in the long run reveal either the best or the worst conditions that exist.

The CHAIRMAN. But you have arrived at a point where you are compelled to walk by faith and not by sight.

Mr. BURR. Only by the faith that rests upon a very firm foundation of facts.

The CHAIRMAN. In other cases, but not in this case.

Mr. BURR. In this case.

The CHAIRMAN. They have escaped me. Now, when we come back to Boca San Carlos borings, you are entirely satisfied that you have a good foundation for a dam there?

Mr. BURR. At Conchuda?

The CHAIRMAN. At Boca San Carlos, reported by Admiral Walker in his first report.

Mr. BURR. I can not say that I feel sure of that. In fact I was not on that Commission.

The CHAIRMAN. You took his borings he had made on his former commission and you increased them.

Mr. BURR. No; we were not satisfied. I do not believe there was an engineer member of the Commission satisfied that the borings already made were sufficient to settle the character of that crossing.

The CHAIRMAN. And thereupon you made more?

Mr. BURR. Thereupon we made more.

The CHAIRMAN. When you got through making the borings you were then satisfied?

Mr. BURR. Not altogether satisfied, because we did not complete all the borings which we might have made there for the reason that a much better site was found at Conchuda.

The CHAIRMAN. You moved up the river a few miles, 5 miles or about 5 miles, because you found a better site?

Mr. BURR. Yes.

The CHAIRMAN. How much better was it?

Mr. BURR. It was a difference, as I recollect the figures, of between about 82 feet under water to the deepest excavation and 100 feet under water. That is a gain of 18 feet, which is a material gain.

The CHAIRMAN. Then you went diligently to work to make borings at Conchuda?

Mr. BURR. We did.

The CHAIRMAN. Did you become satisfied you could build a dam there without any trouble, with the pneumatic or any other process?

Mr. BURR. Perfectly satisfied that it can be built by pneumatic process.

The CHAIRMAN. And you went 5 miles up the river in order to get that degree of satisfaction as to the foundations, the depth of it?

Mr. BURR. We went that distance up the river because we were satisfied we had a better location.

The CHAIRMAN. I say that is your reason for going up.

Mr. BURR. We could put the dam in for less money.

The CHAIRMAN. And that involved the construction of about 5 miles of canal between Boca San Carlos and Conchuda?

Mr. BURR. I don't know where we should have entered the San Juan River if we had fixed upon Boca San Carlos as the location for the dam.

The CHAIRMAN. It was about a mile above the dam, according to Walker's survey.

Mr. BURR. Ah, yes, but that was not the end of the matter. It is not unlikely that the canal line might have been laid just where it is now, even had we held——

The CHAIRMAN. At Conchuda you go a mile above the dam to get away from the San Juan River with your channel.

Mr. BURR. Yes; more than a mile—nearly 3 miles.

The CHAIRMAN. That was a long way to go, and a great expense, in order to get a lower depth of water at Conchuda than you found at San Carlos?

Mr. BURR. Pardon me; I do not admit that the additional length of canal which the Isthmian Commission laid down and now recommends for the Nicaragua route, if that route were to be selected, was due to the location of the dam at Conchuda rather than at Boca San Carlos. I am inclined to think that location would remain just as it is, whether the dam is at one place or the other.

The CHAIRMAN. Why?

Mr. BURR. Because the alignment is so much better; the alignment was originally very crooked.

The CHAIRMAN. Getting into the river?

Mr. BURR. Yes; it was a curvature of a character that ought to be avoided if feasible to do so.

The CHAIRMAN. Do you recollect about the radius of it?

Mr. BURR. I do not remember the radius of it, but it was altogether not far from a complete circle.

The CHAIRMAN. Now, in passing up from Boca San Carlos to Conchuda, to the exit or mouth of the canal, at those places you go through a place that has been described here as very difficult.

Mr. BURR. That is expensive for the canal line, you mean?

The CHAIRMAN. Yes.

Mr. BURR. Yes; it is heavy work there.

The CHAIRMAN. And you encountered that also in order to come up this low rock—I mean high rock—rock that was not so deep?

Mr. BURR. Not altogether. I should have been in favor, I have no hesitation in saying, of leaving the canal line substantially as it is now whether the dam were at Boca San Carlos or Conchuda, because the line would be so much improved.

The CHAIRMAN. About the curvature coming in there—is that greater than the curvature where you enter the bay coming in from the sea at Colon?

Mr. BURR. It is a much worse curvature.

The CHAIRMAN. But at that point at Colon you have to remove the bottom 2 or 3 feet or more of all of that bay for how many feet out from the point of the curve?

Mr. BURR. I do not recall. Say it is half a mile; I do not know what it is.

The CHAIRMAN. So you have to sweep all around that matter and remove the whole bottom of that bay for half a mile in order to get room for your ships to come in around that curve?

Mr. BURR. For a width of 500 feet; we do not excavate the whole bay, but for the width of 500 feet.

The CHAIRMAN. I mean that; so that when you encounter on the Panama route a sharp curve you simply cut off the territory opposite to it to give you width to turn around in?

Mr. BURR. I do not quite understand.

The CHAIRMAN. You come in through there at Colon, and there is this point on which the De Lesseps house is, and just back of that is the harbor that you propose to dredge, as a safe harbor against these northers. In order to get into that safe harbor and turn that point, which is a sharp one, you make an excavation in width 500 feet, 35 feet deep, as I understand your programme.

Mr. BURR. The depth of water would be 35 feet.

The CHAIRMAN. Yes; and you have got to cut down 3 or 4 or 5 feet to get to that depth of water.

Mr. BURR. Yes.

The CHAIRMAN. With such expenditure carried down at this point where you turn into San Juan River above dam No. 4, or Boca San Carlos, wouldn't you get the same result?

Mr. BURR. There is much more curvature at Boca San Carlos, or would be with that alignment, than at the entrance at Colon. We would avoid the curvature at Colon if we could; in fact, we considered very seriously going straight through this artificial point made by the old Panama Canal Company.

The CHAIRMAN. I see that in addition to Mr. Morison's writing that I have been reading to you he has been making another address, of which he has sent me a copy; very kindly, I think. I suppose this is his writing on the outside; look and see if it is not.

Mr. BURR. Yes; that is his handwriting.

The CHAIRMAN. In which he makes statements that rather surprise me, and I want to ask you a question or two about them.

Mr. BURR. The curvature at the entrance of Colon Harbor is a very easy one. It has a radius of 6,560 feet, a radius of considerably over a mile. That is, around that point, just at the inner harbor, where we get around the point, is a little sharper curvature, and we have a width there of 800 feet.

The CHAIRMAN. Mr. Morison in this paper makes a statement that I want to read you and have you explain, if you please:

"Lake Nicaragua furnishes an indefinite amount of water for summit-level supply. It furnishes almost too much water; it is so great a supply that the water used by the canal is immaterial in proportion to that required for evaporation. The difficulties lie in keeping the lake within reasonable limits; holding it high enough at the end of each wet season to prevent evaporation bringing it too low at the end of the dry season."

Did such a difficulty as that ever occur to you about it?

Mr. BURR. I think that refers simply to the regulation of the level of Lake Nicaragua.

The CHAIRMAN. Well, that is done by sluices put on top of the dam at Conchuda.

Mr. BURR. Yes; and a waste way along side of it.

The CHAIRMAN. Well, is there any difficulty in that?

Mr. BURR. No; there is no difficulty in accomplishing that end. I do not understand that Mr. Morrison referred to it in that way. Of

course I do not pretend to explain what Mr. Morrison may have had in mind in regard to that matter, he must explain that himself, but so far as the regulation of the lake is concerned, I suppose he means that if the lake were left to itself there would be times when too much water would flow down the river, that being a surplusage from the rainy season, while at the end of the dry season, after the loss by evaporation from the lake, which is very large, there would not be a sufficient amount of water running down the river to supply the needs of the canal.

Now the problem is to adjust those conditions, and those are all completely adjusted in the plan proposed by the Commission. In fact a great deal of study was given to that subject, extending over a period of several months.

The CHAIRMAN. About how high is the highest vertical flood, measured in inches or feet, of the San Juan River at its flood tide, if it ever has any above the normal.

Mr. BURR. I do not know that I can give you that, and I do not know that it is mentioned in the report, because the most violent rises of the river level are below the junction of the San Carlos and the San Juan, where it is a matter of no consequence to the canal line.

The CHAIRMAN. And above that there are very few streams coming in?

Mr. BURR. Above that there are surplus discharges through the lake to the extent of about 100,000 cubic feet a second, which have to be provided for in this movable gate arrangement over the dam.

The CHAIRMAN. But there are no lateral streams coming in between the lake and Conchuda dam of any consequence.

Mr. BURR. Not large ones. The greatest is the Savalos, as it is called, which empties into the San Juan perhaps half way between the lake and the dam, and that stream may possibly supply as much as 50,000 cubic feet a second for a day or so, but that does not exert any sensible effect upon the situation. It is all provided for and easily provided for with the regulating appliances that are set forth by the Commission.

The CHAIRMAN. Well, I supposed that that factor was so well understood by the engineers who passed over this work and measured that river so often that their omission to take any notice of it at all was equivalent to an assertion or demonstration that the flood tide in the San Juan River was something that did not have to be controlled by very extraordinary engineering methods.

Mr. BURR. The rises in the upper part of the river are not violent as compared with those in the lower part, but as I said a moment ago, the rises in the lower part are of no consequence.

The CHAIRMAN. We have not anything to do with that, because we leave the river before we get to those places.

Mr. BURR. That is the situation. Will you be kind enough to read that expression once more?

The CHAIRMAN. "The difficulties lie in keeping the lake within reasonable limits, holding it high enough at the end of each wet season to prevent evaporation bringing it too low at the end of the dry season. That difficulty will be better understood when it is remembered that there have been times when two dry seasons had a comparatively wet season between them, when for eighteen months the amount of evaporation exceeded the entire inflow into the canal."

Mr. BURR. I see what that means. His language perhaps standing by itself might convey an erroneous construction.

All that he means there, I think, is that the lake regulation is a part of the whole problem which had to be carefully treated, but it is provided for in an entirely satisfactory manner in a way which leaves no real difficulty unprovided for.

The CHAIRMAN. Now, in another place he says:

"The climate on the west side of the lake is very good for a tropical climate. The rainfall at Greytown averages about 240 inches per year. The portion of the line through which the canal proper would be built, the first 50 miles between Greytown and San Juan, is nearly as rainy as Greytown itself. It is a country practically with one wet season which lasts two years, doubling over one that preceded it."

Mr. BURR. I think that is a more difficult expression to understand than the other one.

The CHAIRMAN. Well, it seems to me so. He preceded that, however, with this statement: "The climate on the east side is one of the worst in the world."

Mr. BURR. That means between Greytown and the lake?

The CHAIRMAN. Yes.

Mr. BURR. A climate in which 240 to 300 inches of rainfall in a year is not one which would be chosen ordinarily for residence purposes, but I should hesitate to say that it is the worst in the world.

The CHAIRMAN. I do not think I need to dwell on that.

Mr. BURR. But I hope, Mr. Chairman, that you will not hold it necessary for me to explain any passages from that address.

The CHAIRMAN. No; I do not; but Mr. Morison has been here, and he seems to be lecturing all over the country for the purpose of carrying his views into effect. He starts up a new proposition every day he makes a lecture, and I wanted to know how far the engineers propose to follow him. Then again he says, speaking of the Chagres River:

"During three months of the dry season its discharge may be as low as 300 feet or thereabouts per second. It looked like it had dried up. * * * Once in a while, however, there comes a tremendous flood. It is possible that the largest floods in the Chagres are as big as the largest floods in the San Juan, but that does not seem probable."

Have you ever noticed any sign or received any information of such floods in the San Juan River as we know to exist in the Chagres?

Mr. BURR. I think there are times, Mr. Chairman, when the floods of the San Carlos, united with the high waters in the lake, will yield a larger flood flow than we have any reason to believe ever takes place in the Chagres; but again, that brings us back to the same point, that it is in a part of the San Juan below the dam where it is not a matter of any consequence.

The CHAIRMAN. It does not affect the canal at all?

Mr. BURR. No.

The CHAIRMAN. Well, I will not detain you further about that. Yesterday Colonel Ernst furnished us with a memorandum that we have never had before. He stated in his deposition that the Isthmian Canal Commission had made up a statement of the comparative expenses of operating the two routes, but had not printed it, but that he had a copy of it and would produce it, and did. Now, I find these conclusions summed up by him under different heads under the cost of

operation. In Nicaragua the engineers' department is to cost \$1,305,742, and at Panama, \$707,612. I take it that, inasmuch as that summing up in Colonel Ernst's statement here of the amount of cost of the different items in the engineers' department there, that it includes all the work done by the engineers of every kind, includes repairs to the respective canals and——

Mr. BURR. Whatever is done under the engineering force, everything—material, labor, and all else.

The CHAIRMAN. And that is the comparison made between the two there?

Mr. BURR. Yes.

The CHAIRMAN. Then when we come to the transit department, he makes the expense of the Nicaragua Canal at \$666,660, and of the Panama Canal, \$351,340. That includes the movement of ships, and including all the officers, and their pay, necessary to keep that department in operation, as this other includes all dredging and all repairing that may be done to the line of the canal or the locks, or any other place in the two canals.

Mr. BURR. Yes.

The CHAIRMAN. And then he comes to the law department and he puts the expenses of the law department at Nicaragua at \$18,700 and of the Panama at \$15,300. That difference is made up by his allowance to Nicaragua of three justices of the peace. I do not know what the Commission meant by not allowing a justice of the peace in Panama, whether there was no justice to be administered, or whether or not the people were so good that they did not need any officers.

Mr. BURR. I do not carry in my mind the details of that scheme.

The CHAIRMAN. Here is something a little more remarkable to me. That is the medical department. He makes it cost \$125,980 a year at Nicaragua and \$104,460 at Panama. Well, Panama, according to the testimony here, is a very much more unwholesome climate than Nicaragua.

Mr. BURR. I do not think so, Mr. Chairman.

The CHAIRMAN. Well, taking the facts as they exist—not conjectures, but the facts as they exist, the data we have—did you come to the conclusion that Nicaragua was more unhealthful than Panama?

Mr. BURR. No; not more. I do not think there is any difference between them that is sensible. There is at Panama a great deal of sickness at the present time, many deaths, and there have been in the past, but it is a line of continuous population from one ocean to the other, and with one or two large centers of population. It is situated upon converging currents of travel, along which many people from infected places are constantly passing.

There is absolutely nothing done there that makes for public health, and you have the natural results of the constant presence of yellow fever and other tropical fevers and ailments belonging to such conditions. Whereas on the Nicaragua route there is nobody there to be sick. The Nicaragua route from Greytown to Brito is practically an uninhabited country. There is a small population at Greytown, and steamships call there occasionally, and there is a little business, but it is practically set off from the outside world. The little place of Castillo, approximately halfway from Greytown to the lake, has a few people, constituting an isolated population. Fort San Carlos has a small population. I suppose that perhaps 500 people at each one of

those places would probably cover all inhabitants. Outside of that there is nothing in the way of population on that whole route from the Caribbean Sea to the Pacific; but there have been dreadful epidemics of yellow fever in Nicaragua in times past, as at Leon. From the accounts given of it, there can be little or no doubt that it was yellow fever, and they have at Managua, at the present time, fevers which I was assured by Mr. Donaldson, the United States consul, are yellow fever, or something just as bad.

The CHAIRMAN. Mr. Donaldson?

Mr. BURR. Yes.

The CHAIRMAN. I have his deposition here.

Mr. BURR. That there is no yellow fever?

The CHAIRMAN. On those very points; yes, sir.

Mr. BURR. I suppose he may properly make that deposition, but what I tell you is what he told me, in mentioning the death of a young American there. There is not what is specifically called yellow fever, but there have been fatal epidemics at the old capital of Leon in times past that are historic.

The CHAIRMAN. Could you give me a citation to those authorities?

Mr. BURR. In Squires's book on Nicaragua—I have forgotten the title, but he was, I think, the first United States consul there, was he not?

The CHAIRMAN. He was consul to several States down there in Central America—in the earlier times—about the time that we acquired Mexico.

Mr. BURR. Yes; I think it was prior to 1850. He makes abundant reference to them, and I believe that if a large force of laborers were put upon the Nicaragua Canal for its construction, and there were brought into that country the seeds of disease that have been brought into Panama, there would be practically the same conditions to deal with in one place as in the other. It is equally malarial, naturally. The death rate of Nicaragua, so far as anybody can know anything about it, at Managua and other Nicaraguan towns, is appallingly high. In fact, Mr. Donaldson himself had to move out of the house in Managua, where he was living with his family, up into the suburbs on higher ground in order to save himself from illness.

The CHAIRMAN. He testifies that that was in order to save himself from filthy neighbors.

Mr. BURR. They are filthy; I do not wonder he wanted to get rid of them. That is just the point. Those people have no idea of sanitary conditions, and the worst of it is that they do not seem to care to have any; but if you were to introduce into the towns of Nicaragua and Panama the same sanitation which we use in this country, and enforce them with the rigor of military discipline, if necessary, I believe you would have just as healthy a country as you have in Alabama.

The CHAIRMAN. Oh, no; not as good as that. That is the best in the world.

Mr. BURR. Perhaps not as good as that, but certainly as good as New Orleans or Memphis, and there would be no trouble about the climate; but that whole country at the present time is characterized not only by the absence of everything that makes for public health and for suitable sanitation, but the most gross and abominable violations of those conditions. In fact these people are just as Mr. Don-

aldson has said, filthy beyond measure, and they do everything that makes for public unhealth.

The CHAIRMAN. How much better are they in Panama?

Mr. BURR. They are no better; it is the same thing. My observations are applied to Panama as well as to Nicaragua. There is not a particle of difference. The people of Managua are taking their public water supply direct from the drainage of their own city, but they are doing better than that at Panama. Yet there are no suitable sanitary conditions at Panama at the present time, nor are there at Colon. They are dirty places, both of them, and there is not a city in Central America that is not dirty, just as dirty as filth can make it. That is equally true of both countries, and I do not believe that there is any sensible difference between the sanitary conditions which must be maintained whether the Nicaragua route is adopted or the Panama. There have been more deaths on the Panama line simply because there are more people there to die.

The CHAIRMAN. Now, you have made a very full statement and a very decided one on the subject of the health down there. Can you cite me to the authorities upon which you rely for those opinions?

Mr. BURR. I rely very largely on my observations while there.

The CHAIRMAN. State your observations, please.

Mr. BURR. This unsanitary condition to which I have referred.

The CHAIRMAN. I know; but about the actual health of the people. Did you see any number of sick people in Nicaragua?

Mr. BURR. I did not go into the hospitals.

The CHAIRMAN. Do you know whether they had any, or not?

Mr. BURR. It was a matter of constant conversation wherever the question was raised. Mr. Donaldson himself—I do not know what his deposition may be—gave me much of this information as to Managua.

The CHAIRMAN. Yes. Well, we have his deposition here.

Mr. BURR. I can not say that there is any yellow fever at present in any part of Nicaragua.

The CHAIRMAN. And we have also the deposition of the recent consul at Greytown.

Mr. BURR. Greytown is a healthy place apparently, but I think that is largely due to the fact of the constant rainfall, which washes away a good deal of the filth that would otherwise be injurious to health.

The CHAIRMAN. I want to read you what Mr. Treat says on that subject. Mr. Treat went out there and contracted to build 10 miles of railroad from Greytown on the old Menocal line, right back to the divide. He built about 10 miles of it, and after he left there they added probably 4, making about 14 miles in all. I will read to you, as follows:

“The CHAIRMAN. This railroad that you built in Nicaragua was 10 miles long?

“Mr. TREAT. Yes, sir.

“The CHAIRMAN. Was it a good, strong road?

“Mr. TREAT. Yes, sir.

“The CHAIRMAN. Sufficient for the purpose of conducting the canal work at the opening of that canal?

“Mr. TREAT. Oh, yes; it was a first-class road as to ability to carry traffic. It was a good, substantial road.

“The CHAIRMAN. Now, at what cost per mile was that road built?

“Mr. TREAT. The whole cost was about \$30,000 a mile.

"The CHAIRMAN. Where did you get your cross-ties?

"Mr. TREAT. I got some from the timber alongside the track, and some cypress ties from New Orleans.

"The CHAIRMAN. About how many men did you have under you while you were at work there?

"Mr. TREAT. Perhaps a couple of hundred at the start up to the neighborhood of 1,000. I think I had nearly 1,000 after two months and from that up to the end.

"The CHAIRMAN. How long did you keep them there?

"Mr. TREAT. Seven months.

"The CHAIRMAN. State what kind of work they did.

"Mr. TREAT. Why, of course a large part of the work was right in these swamps, in water. I cut down the trees and cut them up into lengths, some very large trees, 3 feet in diameter, mostly very heavy timber that would not float, and the work was to drag these logs through the water; they would so nearly float that 20 to 30 men would tie a rope to a big log and drag it along on the bottom to the place they wanted it and then turn it around onto the line of the railroad, so that the work that these men did was wholly cutting these trees and putting them in place to form a part of the embankment, a foundation for the embankment, and fully half of the men were working in this water ten hours a day.

"The CHAIRMAN. Every day?

"Mr. TREAT. Yes; every day. Out of seven months we lost only two half days from any reason, and that was on account of cold rains.

"The CHAIRMAN. And that is all the time that you lost?

"Mr. TREAT. That is all the time that we lost. We did not work on Sunday.

"The CHAIRMAN. Well, what was the condition of health of your men?

"Mr. TREAT. Why, the first lot of men that we had there from Jamaica were a poor lot, picked up off the streets largely and in poor health, seemed to be half starved. I should say that their general health improved while they were on the work. At the end of the work they went away looking better and feeling better than when they commenced. They had good food, a good dry place to sleep, and when they were sick a good hospital to go to.

"The CHAIRMAN. At Nicaragua there, through from Greytown to Brito, do you consider it a healthy country?

"Mr. TREAT. I do, indeed. I consider it to be a much healthier country than most tropical countries, very much. In fact, Nicaragua seemed to me just as healthy as the average part of the United States. I would just as soon do work there as in any part of the United States, so far as work is concerned. I ought to add about my laborers there on the work, that I had only two deaths from disease during that whole seven months out of the whole force. That would be a good record in any country.

"The CHAIRMAN. Your force numbered 1,000 men, take them through and through, comers and goers?

"Mr. TREAT. No, sir; comers and goers, there were a good many more than a thousand men.

"The CHAIRMAN. About how many should you say?

"Mr. TREAT. I should say somewhere between 1,500 and 2,000.

"The CHAIRMAN. Men that would come and drop in and drop out?

“Mr. TREAT. Yes, sir; I had quite a force; 200 or 300 natives, Costa Ricans and Nicaraguans, as well as Jamaicans.”

Now, with a fact like that before you, actual work done on a canal 10 miles long and through a swamp 8 miles of the distance, what would you then say?

Mr. BURR. I will tell you. When the old Maritime Canal Company started operations on that work, there were two young engineer friends of mine, and one whom I knew about but was not acquainted with, worked, I should imagine, in just about the same country that Mr. Treat speaks about, and two of them came back barely alive, but they did recover.

The CHAIRMAN. To what country did they go?

Mr. BURR. To Nicaragua, to Greytown; and the third one committed suicide while he was there, I was told, because he was sick. It affected his mind in that way. I do not know how true that is, but it was a fact that he committed suicide.

Senator KITTREDGE. Who were the gentlemen?

Mr. BURR. One was Mr. Johnson and the other a Mr. Maguire.

That record which Mr. Treat gives confirms our own experience—I mean the Commission's experience—with its force. We had very little sickness. We did have a few sick men. One of them was very sick; in fact, another came back and died here in Washington of yellow fever; I think he got it at Port Limon, a Costa Rican port, on his way back. Our men were, many of them, in the swamps, just as Mr. Treat states. I attribute the healthfulness in our own force to two or three things which will go a long way toward good health, either in Nicaragua or Panama, or in any other Central American country.

In the first place, we had an excellent commissary. We had good food. We were not dependent upon native supplies. That, I think, is a very important matter.

Again, while they used the native water, they were charged to boil it always, and I believe as a rule that was done. That is another very important precaution to take. Again, while they would be wet all day, they had a comfortable camp. In other words, their conditions of living were all favorable to health.

On the other hand, our chief engineer at Panama had yellow fever, and there was more sickness in our force at Panama than in Nicaragua; but the exposure was greater. In fact, there was yellow fever while we were there. There is yellow fever, I believe, always on the Isthmus of Panama. I know of no reason why Panama should be more unhealthy than Nicaragua under the same conditions of living.

The CHAIRMAN. In discussing this subject of the estimates for the medical department at each place, nothing is charged to Panama here for the sanitation of the city of Panama, or the city of Colon, or the inhabitants whom you say thickly populate that country between the two places.

Mr. BURR. But, Mr. Chairman, that is an estimate for the maintenance and operation of the canal.

The CHAIRMAN. I know it is.

Mr. BURR. That is on the supposition that if the canal were built on the Panama route, one of the first measures to be taken would be the proper sanitation not only of Panama, but of Colon and every other point along that line.

The CHAIRMAN. But you do not include that in your estimates either of operation or maintenance, or in the estimate of the cost.

Mr. BURR. Yes, pardon me; it is included in the estimate of cost.

The CHAIRMAN. In what way?

Mr. BURR. In the 20 per cent.

The CHAIRMAN. In the 20 per cent for contingencies of the cost of the canal?

Mr. BURR. Yes.

The CHAIRMAN. But you put the same contingencies on both canals?

Mr. BURR. The same percentage, but not the same amount.

The CHAIRMAN. Therefore you do not, either in the contingencies or in the estimates of the cost of the operation or maintenance, include the sanitation of the city of Panama or the city of Colon, or of the people between the two?

Mr. BURR. No; but I have just explained that the cost of doing that is included in the estimates, but that does not include, for either route, the cost of introducing any special system of sanitation, because that system of sanitation, whatever it is, is included in the estimate of the cost of the work.

The CHAIRMAN. You put the same estimate for contingencies on both routes, and one of them is healthy and the other is not.

Mr. BURR. We put the same percentage for contingencies, and I believe that the percentage of contingencies should be smaller for Panama than Nicaragua, because the conditions existing there are better known.

The CHAIRMAN. Do you include the maintenance of the health of these cities in your statement that it should be smaller at Panama than at Nicaragua?

Mr. BURR. I believe there will be no essential difference in that. I think that one country will be about the same as the other, as far as public health is concerned. As the population increases along the Nicaragua route, there would be fully the cost of sanitation which you would have on the Panama route, and I believe more, because it is longer, and there would be more population and more spots or centers of epidemics to be cared for.

The CHAIRMAN. That statement brings in view two propositions upon which I wish to ask you some questions. There is no town now at Brito, is there?

Mr. BURR. There is not even a human being there.

The CHAIRMAN. And there is almost no town at Greytown?

Mr. BURR. That is a small place; I suppose five or six hundred people, perhaps more.

The CHAIRMAN. And you say it is very healthy?

Mr. BURR. As far as I know, it is.

The CHAIRMAN. You know as much about that as you do about any other part of the country there, do you not?

Mr. BURR. Not as much as I do about Brito. I say it is healthy.

The CHAIRMAN. If we build a canal at Nicaragua, we establish our own town at Brito, and virtually we establish our own town at Greytown, and we permit those people to come and settle on the canal line that we want to settle there and nobody else, and the country is not populated on either side of the canal line, you say, or is very thinly populated, so that the health conditions would be entirely under the control of the United States from the beginning, and so with the police conditions. Now, in view of that, would you think it would be as expensive to maintain a good health régime and to make provision for

sanitation on the Nicaragua line as it would be on the Panama canal with 5,000 or 6,000 people at Colon, and 20,000 to 30,000 people at Panama, within 3 miles of the line, and a dense population, as you describe it, between the two points? Which do you think would be the most likely to be successful in sanitation, and which would be the most expensive?

Mr. BURR. I do not believe that there is any difference which can be foreseen or reasonably estimated at the present time. The population of the country is almost nothing on the Nicaragua route, but a considerably larger force of men would have to be brought there, and in that country that would involve a very large sanitary expense. I believe that before the canal were half completed, if not at the start, the cost of sanitation of the Nicaragua route would be liable to exceed that even on the Panama route; but the first cost of sanitation would be far greater at Panama than at Nicaragua, because the first measure that should be taken on the Panama route would be a thorough and drastic sanitation of that strip of country from Panama to Colon. That would be the first essential step. It would be a grave mistake to do anything else before the city of Panama and the city of Colon, as well as the country between the two, were put in a thoroughly satisfactory sanitary condition. It is perfectly feasible to do it. Measures for accomplishing that purpose are well known and available at the present time.

The CHAIRMAN. What kind of people do you find in the city of Panama?

Mr. BURR. There is the usual Spanish-American population. A small percentage, nobody knows how much, say 10 per cent for the purposes of an estimate, may be intelligent people who are amenable to reasonable suggestions of life.

The CHAIRMAN. Is it a turbulent population?

Mr. BURR. It does not appear to be so. I do not think that the population is turbulent. Those people are too easy-going for that.

The CHAIRMAN. They have a good many pronunciamientos and fights that we have to go and fix up, do they not?

Mr. BURR. They have revolutions, yes; but that does not mean a turbulent population.

The CHAIRMAN. What does it mean? We have had four or five occasions when we had to go there with ships of war. Does it mean simply political insurrections?

Mr. BURR. By a turbulent population I should understand one which would require a very expensive and active police supervision constantly, rather than spasmodic revolutions.

The CHAIRMAN. Well, I think I have gone as far with you, Professor, as I ought to attempt to go now. I could ask you a good many more questions.

Mr. BURR. I am at your service.

The CHAIRMAN. But I have not the time this evening to do it, and you have not the time to sit here.

The committee (at 5 p. m.) took a recess until Monday, February 24, at 10.30 a. m.

STATEMENT

OF

GENERAL HENRY L. ABBOT

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Tuesday, March 4, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (Chairman), Hanna, and Foster of Louisiana; also Senators Harris and Millard, members of the committee.

Gen. Henry L. Abbot, C. E., U. S. A., appeared and was duly sworn by the Chairman.

STATEMENT OF GEN. HENRY L. ABBOT.

The CHAIRMAN. Senator Hanna, will you conduct the examination?

Senator HANNA. General Abbot, what is your profession?

General ABBOT. I am a retired officer of the Corps of Engineers.

Senator HANNA. Of the United States Army?

General ABBOT. Of the United States Army. I was graduated in 1854, at West Point, and have served all my life, until I was retired in 1895, in the Corps of Engineers.

Senator HANNA. During that time what experience have you had in general engineering work, and on public works?

General ABBOT. My first duty was in California, where I was detailed as an assistant to Lieutenant Williamson on the survey of the Sierra Nevada and Cascade ranges between California and the Columbia River. It devolved on me to prepare the final report, because Lieutenant Williamson was taken dangerously sick. That report constitutes volume 6 of the Pacific Railroad Surveys. Upon completing that work I was detailed as assistant to General Humphreys, then captain, in the investigations for the protection of the alluvial regions of the Mississippi against overflow. I spent four years in that work, and we finished the report which, through the kindness of General Humphreys, bears my name as well as his own, just in time for the breaking out of the civil war.

I took part during the civil war, in the field, during the whole war, and at the end of it I was ordered to Willets Point to command the battalion of engineers, to construct the fort at Willets Point and Fort Schuyler, to experimentally develop a system of torpedo defense for the coast, and to organize the engineer school of application.

Finishing that work, I was ordered to New York City, where I soon became the president of the permanent board of engineers, to which is referred the most important engineering questions that come before the Department.

I was also the division engineer at that time of the northeast division, which included all the work, civil and military, under the charge of the engineer department in New England, New York, New Jersey, as far as the Delaware River, including that river, and in Ohio to the

western limit of Lake Erie. That work I continued up to the time of my retirement.

Immediately after my retirement I was employed by the Wisconsin Central Railroad to prepare the plan for their interior harbor at Manitowoc, Lake Michigan, where they were establishing a car ferry to open up a new route between St. Paul and Buffalo.

I finished that work, and then I was detailed by the president of the National Academy of Sciences as one of the members of the commission requested by the Secretary of the Interior to study and report upon the question of forest reservations and reserves in the West.

We made a long, careful investigation of the subject and made our report. At the end of that time I was invited to act as the president of a board of consulting engineers, to advise the city of Pittsburg in respect to a canal which they were projecting to connect Pittsburg with Lake Erie.

At the end of that time I was invited by the New Panama Canal Company to serve as one of their technical commission, to advise them as to the data necessary to collect, and to discuss the results when collected, with a view to perfect a plan for a canal.

Senator HARRIS. That was the new company?

General ABBOT. Yes; that was in 1897, when my connection with the new company began, and I have served with it up to the present time; for since the completion of the work of the technical commission I have been engaged in the analysis of recent data received from the isthmus, for the benefit of the company and of the Isthmian Canal Commission. The latter desired to have the latest information, and so the company have sent the monthly records to me, and I have put them into shape for the use of the commission.

Senator HANNA. I understand, General, that the purpose of that commission was that the new company might get facts and information which would decide them as to whether they would go ahead to complete the canal.

General ABBOT. That was the intention, sir; and the agreement with the liquidateur was that in case they decided to undertake it they would be governed by certain specified conditions.

The question submitted to the comité technique was to decide whether it was economical and desirable to complete the canal; and if so, to elaborate a definite project for so doing.

That was the fundamental idea; but I should say in this connection, that as these investigations were made necessarily on an extensive and expensive scale which involved a large amount of digging (some five or six million cubic yards of material have been taken out), it was important that this work should contribute to the completion of the canal. The material was therefore taken out, not in the way that the old company had proceeded, by making a shallow excavation over the top of the entire cut, but by making a comparatively vertical cut, so as to penetrate the lower strata in the Culebra and Emperador cuts, and thus develop exactly what would be ultimately encountered in completing the canal. In addition, many borings and pits were carried down to the very bottom of the projected canal, so that, while the yards taken out were all in the interest of the completion of the canal, they were taken out in such a way as to throw light on the future conditions of the problem.

Senator HARRIS. The relation you speak of existed with the new company, and still exists.

General ABBOT. It exists in this way: I was a member of the Comité Technique, which has completed its labors and adjourned sine die—that is, has been dissolved; but since that time I have received these monthly reports as a consulting engineer of the company and have worked them up in America, for the company and for the Isthmian Canal Commission, thus saving a good deal of time in transmitting the records twice across the ocean.

Senator HARRIS. You were doing that for the Panama Canal Company?

General ABBOT. For the New Panama Canal Company, yes, sir. I was a member of the Comité Technique as long as it existed, and since that time I have been a consulting engineer of the company.

The CHAIRMAN. While you were acting for the old company, were you acting in the employment of the liquidator?

General ABBOT. I did not have anything to do with the old company. I began to serve in 1897, and the new company was organized in October, 1894. I had nothing whatever to do with the old company.

The CHAIRMAN. Or the liquidator?

General ABBOT. Or the liquidator; no, sir.

Senator HANNA. That commission was composed of quite a number of eminent engineers?

General ABBOT. Yes; I have reason to be proud of association with such gentlemen. We had the chief engineer of the Manchester Ship Canal, the chief engineer of Kiel Canal, one of the governing board of directors under which the Kiel Canal was constructed; we had five very distinguished retired officers of the Corps des Ponts et Chaussées and Corps des Mines, of France. Also, the engineer in chief of the Compagnie Transatlantique, the great commercial company of France, who gave us the benefit of his knowledge as to the requirements of ships.

Of the American members we had Mr. Fteley, who was at that time constructing the largest dam in the world, the new Croton dam for the supply of New York City with water, and past president of the Society of Civil Engineers. The other American member was Mr. Sosa, who was a Colombian, but who was educated in our Troy Polytechnic School, and who to all intents and purposes was an American engineer.

Senator HANNA. Were there any other foreign engineers?

General ABBOT. Yes; we had an inspector-general, retired, of the Corps des Mines, the great mining corps of Russia, Mr. Skalkowski. In all, there were 7 French engineers and 7 of other nationalities.

Senator HANNA. Any German engineers?

General ABBOT. We had the two I have mentioned, the chief engineer of the Kiel Canal, and a member of the governing board directing the construction of the canal.

Senator HANNA. And also one from England, connected with the Manchester Canal.

General ABBOT. Yes, the chief engineer of the Manchester Canal. These gentlemen studied the problem with extreme care. In the early investigations they were not all present at our biweekly meetings, but when the material was collected, and the final discussion of the project took place, the whole matter was studied in the most thorough manner, and our conclusions were absolutely unanimous.

We had estimates for sixteen different projects, with a view to determine the best and the cheapest, differing chiefly in respect to the

elevation of the summit level. Of course, the lower this level the greater the excavation in the Culebra cut; and the higher this level the more expense in lock and dam construction. To balance these considerations, and to cover the many other points involved, we deemed sixteen elaborate computations necessary, of which the details were worked out by the chief engineer of the company, Mr. Louis Choron, who is one of the best engineers with whom I have ever been associated. He is a man of clear head and active mind and an indefatigable worker. I imagine that he labored until midnight many a night in connection with work for our comité technique, in preparing the data that we wanted to consider.

Senator HARRIS. This gentleman had been on the line of the canal?

General ABBOT. Yes.

Senator HARRIS. The chief engineer of the company?

General ABBOT. Oh, yes. He made his inspections there regularly, as often as once a year.

Senator HARRIS. The other gentlemen received the data from him?

General ABBOT. The other gentlemen received reports from a large corps of efficient engineers on the Isthmus, many of whom I met when I inspected the canal. They were all competent men.

Senator HANNA. How many members of your commission visited the Isthmus?

General ABBOT. Well, that I do not know, sir. I can not tell you.

Senator HANNA. You went there?

General ABBOT. Oh, yes; I went over the ground thoroughly. Professor Koch went down with us at that time, and Mr. Etienne and Mr. Zurcher. The director-general of the company, Mr. Hutin, and M. Choron, the chief engineer, were also with us. I think at that time those were the only ones, but others went at different times.

Senator HANNA. The purpose for which this report was secured on the part of the canal company was to decide the question as to whether they should adopt the lock system in the construction of the canal?

General ABBOT. It was to decide the question of what was the best and the most economical system, including both a sea-level canal and a lock canal.

We threw aside the sea-level project as involving too great difficulties under the conditions existing; it would, moreover, be much more expensive. We did not make detailed plans and estimates for such a canal.

Senator HANNA. The present plan under which operations have been conducted there was the plan recommended by that commission?

General ABBOT. Yes. That is to say, we prepared our plan, which has been modified by the American commission.

Senator HANNA. Oh, yes; I understand that.

General ABBOT. Yes, sir.

Senator HANNA. You have read the report of the American commission?

General ABBOT. I have, sir.

Senator HANNA. Do you find anything in that report that leads you to anticipate any physical or engineering difficulties in the construction of the canal as they recommend it?

General ABBOT. I think, sir, that the report of that commission is one which will satisfy engineers that it is an entirely feasible project,

and I think also that the circumstances under which it is prepared should be considered.

Those gentlemen were not called upon to prepare working drawings for the construction of the canal. They were to determine the relative value and the relative merits of all the routs on the Isthmus, a very large undertaking.

They studied the matter very carefully, and, as I say, I think engineers generally will accept their conclusions as being an eminently practical solution of the problem.

At the same time it must be remembered that when an engineer comes to study a plan for actual construction, and limits his mind to one locality, he may well find improvements which can be made in one of several plans at different localities which he has adopted, in connection with several other engineers, without having had time to give that particular plan the same close study. For example, as we have already seen, only three months after the report of the Commission, Mr. Morrison has very much improved the project for a dam at Bohio.

The preliminary plan which the Commission adopted contemplated working at a depth demanding 128 feet of pneumatic pressure, and Mr. Morison shows it to be quite unnecessary. Anyone will admit, I think, that his new scheme is perfectly practicable. This, I think, is an illustration of how the other members of the Commission with more time for study (for they labored under great pressure) might be able to improve their project for the Panama route in other particulars.

While I think the Commission at the time of their report were correct in saying that the difficulties "likely to be encountered in the construction of the dams are less at Conchuda on the Nicaragua line than at Bohio on the Panama route," I think that with Mr. Morison's amendment the dam at Conchuda is very much more difficult than the one he proposes to make at Bohio.

For instance, at the Conchuda dam, foundations have to be prepared at a depth of 82 feet below the low-water level of the river. Now the estimate of the commission is that at times the San Juan may contribute nearly 100,000 cubic feet per second, and the San Carlos, just below, may contribute another hundred thousand. Either one or both will raise the surface of the river very much above this low-water level, from which they estimate their pneumatic pressure of 82 feet, and every small freshet will increase the low-water head, for it is impossible to divert that river from flowing over the excavation for the foundations. The work must be carried on under the river with all its rises. Now all the plans at the Bohio dam contemplate diverting the river and working on dry land, which any engineer will see is very much easier.

Senator HARRIS. Pardon me, General, will the rise in the San Carlos River below affect the height of the water at Conchuda?

General ABBOT. Yes, very much. It backs up the river at once. Thus we know that on the Mississippi River a flood in the Arkansas raises the level of the Mississippi for a long distance above.

Senator HARRIS. It depends on the fall between Conchuda and the mouth of the San Carlos.

General ABBOT. Yes, but that is only that due to about three or four miles; quite a short distance at any rate, and the river will back up.

Senator HARRIS. The fall in the river is to be considered, is it not?

General ABBOT. Of course, but if you raise the water surface up to a certain level at the mouth of the San Carlos, the water above must accommodate itself to that level.

Senator HARRIS. I say, it depends on the fall in the San Juan River, the height to which it would be raised.

General ABBOT. Yes. For instance, here is a very remarkable illustration. There is only a foot of difference in the rise and fall of the tide in the Gulf of Mexico, but we succeeded in the season of dead low water in measuring at the mouth of the Red River an actual tide. We had to do it instrumentally. It was very small, but still that rise of the tide in the Gulf extends up the Mississippi, in its lowest stages, as far as the mouth of the Red River, and gave us a little appreciable tide, half an inch, or something like that, from a rise of only 1 foot at hundreds of miles below, so that a rise in the water surface in the lower portion of a river extends far above. That is a fact very well known to engineers.

Senator HARRIS. You alluded to the concentration of thought on the one plan as leading to improvements. That would be true of any plan, of any line, would it not?

General ABBOT. That would be true of any plan. I have read the report of the evidence taken here before this committee so far as it has been made public, and I have noted three important criticisms which have been directed against the plan as proposed by the Commission. I think it is important in that connection to remember that these criticisms apply to that particular plan, and do not apply to the general problem of the Panama route.

Senator HANNA. What do you mean? Specify the objection.

General ABBOT. Objections that I gather from reading the testimony. I have here a map of the route of the canal which I will use for convenience of reference in a preliminary explanation. We have here the Chagres River rising up in this direction and coming down to Gamboa, near where it joins the line of the canal. The canal starts at Colon and passes over this line here [indicating]. The Bohio dam is here, and all this part between Bohio and Gamboa is supposed to be made into a lake. The plan of the commission and a variant of the plan of the Comité Technique are essentially the same. This variant, known as our low-level plan, we preferred ourselves; but working for a private company, and having to avoid interest costs if unexpected delays should result in excavating the Culebra cut, we arranged the project so as to work for six years without absolutely deciding whether to adopt it or to add another level to the canal above the Lake Bohio level. This alternative plan has not been fully understood, and I have explained it in order to let it be seen that the three objections which have been argued against the American Commission's plan do not apply to our low-level variant.

Now, as to these objections, the first is this: A single dam is contemplated at Bohio. Consequently the flood comes down at Gamboa unchanged. It bursts into the canal with its whole force, which not only may cause an interruption in navigation for a short time, as the commission themselves admit, but also may bring down material which will choke up the canal and make more or less excavation necessary to keep navigation open.

The second objection is this: The plan contemplates turning out all the water escaping from Lake Bohio on one and the same side of the

canal, whence it finds its way down the swamps here [indicating]. As the only reserve or volume of water impounded in Lake Bohio is due to the rise in the level of its surface caused by the inability of a fixed weir 2,000 feet long to pass the flood over its crest without an increased height of water surface, and as the largest floods often arrive in waves, the maximum volume is practically turned without material reduction upon the low country below Bohio, and that, too, on one side of the canal only. In other words, the plan of the Commission regulates the river between Obispo and Bohio, and nowhere else.

Senator HANNA. Whose plan is this you are talking about?

General ABBOT. This is the Isthmian Canal Commission's plan. So, the objectors argue, the whole of this low land will be deeply inundated, and the canal must be protected by levees the height of which can not be estimated, and which must be built on very bad ground. A great point is made of that latter objection.

The CHAIRMAN. Who makes a great point of it?

General ABBOT. The testimony that has been adduced before the committee, which I have read.

The CHAIRMAN. Can you give the name of the witness?

General ABBOT. Well, I have read in haste to note objections raised against the Panama route rather than names of witnesses. That was the statement of a Mr. Plume, was it not? I have read the statements without recording names. The testimony introduced was to the effect that this material is very soft, and that the levees might give way, and that the height might be very great; one gentleman, I think, said something like 40 feet. This would be very much exaggerated; but the Commission does admit the difficulty of not being able to estimate the height in advance.

Now, to return to the objections which have been raised, the third is the difficulty of constructing the Bohio dam, and the flight of two locks with the large lift of 45 feet.

The American Commission plan differs from the canal company low-level plan in these respects: that instead of having a maximum summit level in Lake Bohio of, say, about 65 feet, they have one of, say, about 90 feet, and that they do away with the Alhajuela dam above. Now, it is to these changes that all these objections are due.

The CHAIRMAN. I do not understand your answer.

General ABBOT. These criticisms which have been made here against the plan of the Commission do not hold against a route through Panama, but hold against the plan, the preliminary plan, which the Commission has adopted.

The CHAIRMAN. Do I understand that you object to the plan of the Commission?

General ABBOT. No, sir; I say that it is perfectly practicable; but I say that like all plans it has certain objections, and that those objections can be met by modifications of the plan.

Senator HARRIS. Those objections can be met by a different plan.

Senator HARRIS. Those objections, you say, do not apply to the plan of the canal company.

General ABBOT. No, sir; and I will proceed to show why.

Senator HARRIS. The company's plan involves an upper level and then a lower level.

General ABBOT. No, sir.

Senator HARRIS. You mean the alternate plan?

General ABBOT. I mean the company's low-level plan, which we really contemplate.

Senator HARRIS. Which went down to a level of 65 feet instead of 90?

General ABBOT. Yes.

Senator HARRIS. And you mean that the lower level plan would be free from these objections?

General ABBOT. That it would be free from these objections.

Senator HARRIS. That is what you mean?

General ABBOT. Yes, and I am going to show why.

This Alhajuela dam is situated at an ideal site for a dam. It is across a rocky gorge with a rocky bottom. There is no trouble whatever in making a masonry dam there. Nothing better could be desired. It will form a large lake in the upper Chagres basin. The object of that lake will be, first, to store a supply of water for use during the low-water season of four months, when the rain might be insufficient; and also to stop the sudden floods and not let them come down and strike the canal with the full force.

Senator HARRIS. During the floods?

General ABBOT. During the floods. Suppose that the river at Alhajuela is carrying a certain number of cubic feet per second. We will only let enough of it into the canal to do no harm. The rest of it we will reserve in our lake, and let the lake rise, and when the flood is over we will let the reserve out gradually, so that the discharge entering the canal will be a comparatively uniform volume, instead of consisting of one great wave coming down from the hills. That obviates all possible interference with navigation at the entrance to Lake Bohio because we will never let more water into the canal there than ships can manage.

Senator HARRIS. Pardon me, just a moment on that point, and in relation to the importance of the dam at Alhajuela as controlling the floods. What proportion of the watershed of the Chagres River rises above Alhajuela and what proportion between Alhajuela and Bohio?

General ABBOT. I could give you those figures. I unfortunately have not them here, but the whole area of the valley above Bohio is something like 700 square miles, and of that I can not give you the exact subdivision from memory.

Senator HARRIS. Well, approximately?

General ABBOT. I can give you an idea of it, perhaps, by stating the relative volumes of the discharge. Take the discharge at Bohio as a unit of measurement. The discharge at Gamboa is about seventenths of it, and up here at Alhajuela in great floods it is not more than one-half of it, so that half the water that comes down from the mountains can be caught at Alhajuela, and only so much of it as we desire will be allowed to pass down to Gamboa, reducing the volume there to what would not interfere with navigation or make any trouble. In addition to that, it will avoid the causing of any possible deposits in the lake by reducing the velocity of flow below that required to move them.

And in that connection I should like to state a very interesting fact which struck me in going up this river in a canoe at low water. I have seen a good many rivers, but I have never seen one in which the peculiarities due to its laws of flow are so clearly manifested. There were several little rapids that we had to push up with considerable difficulty in our canoe; but on both sides of the channel the marks of

the different stages in the season of rains could be clearly seen. First, there would be a bar composed entirely of sand. Another bar would be made up wholly of gravel. Another one would be made up of stone an inch in diameter, suitable for making concrete, and others would be composed of bowlders as big as my two fists.

There was no mingling of the sand with the bowlders or gravel. They were deposited separately, and each class was confined to its own limits.

Now, the Chagres River in the rainy season does not flow uniformly. The discharge comes down in a series of freshets, often three or more in a month. These freshets are of different heights and velocities. A little freshet is able to move the sand, and if any has been lodged among the bowlders or gravel it will wash it out. A large freshet will move larger material. So freshets of different volumes have actually divided up and classified the moving materials. The sand moves first, and then when there is a freshet of greater force the gravel is moved, and a freshet of still greater force moves the bowlders. Probably the latter are moved only when one of those great floods occurs, which have appeared only five times in the past fifty years.

Senator HARRIS. Do you find the finer material carried farther than the coarser material? That would be the natural law.

General ABBOT. Undoubtedly that material does come down in the river, and without regulation it will enter the lake, and more or less dredging will be required at the entrance. But with a lake at Alhajuela these variations of flow can be regulated, and no variations will be permitted sufficient to disturb the worst material. What does come down can be very easily taken out with the dredge.

So that I consider that the objections which have been raised in this direction do not lie against the great question of a feasible route through the Isthmus of Panama, but only lie against the preliminary studies of the Isthmian Canal Commission.

Now, coming down to the Bohio dam, the commission turn all the overflow out at the Gigante weir upon the western side of the canal.

Senator HANNA. That is what they call the spillway?

General ABBOT. Yes.

Senator HANNA. The Gigante spillway?

General ABBOT. Yes. Now, it is necessary to have a channel to divert the water of the tributaries that come in on the eastern side; and the old company nearly completed such a channel capable of carrying about 400 cubic meters per second from the lake itself. As the channel is already practically excavated, the new company proposes to use it for 400 of the 1,200 cubic meters per second to which the overflow in floods is limited, allowing the remaining 800 cubic meters to escape over the Gigante spillway and reach the sea on the west side of the canal. By restricting the volume admitted to the lowlands below Bohio to 1,200 cubic meters, and dividing that between the two banks, the problem of protecting the canal presents no difficulty. This very last November we had a large freshet discharging 1,200 cubic meters per second at Bohio, with no overflow of the low district in question.

Senator HARRIS. What is twelve hundred cubic meters per second?

General ABBOT. It is about 35 times 1,200, or 42,000 cubic feet per second. In a word, the plan of the canal company, instead of letting practically nearly the whole flood volume escape upon one side of the

canal below Bohio, allows only so much to leave the lake as can flow quietly through two channels to the sea.

The entire river is regulated and no danger need be feared. This modification of the commission's plan eliminates all that class of criticism.

Now, with reference to the dam and locks at Bohio. For various reasons the technical committee decided to limit the lift of all locks to 9 meters, or, say, 30 feet. Forty-five feet is a lift much larger than that of any existing canal lock, and while not impracticable is certainly objectionable, both on mechanical and financial grounds, for the construction of such locks would be quite expensive.

Moreover, our borings showed that this dam site is underlain by strata of gravel and sand belonging to an old Tertiary formation (not brought in by the present river) and is overlain by a compact bed of clay on which to found the dam; and inasmuch as the question of possible seepage of water through it under the dam or elsewhere does not affect our water supply, because we have all the water we want in the dry season stored up in Lake Alhajuela, we did not have to meet one of the difficulties of the single lake plan, which requires that the lake shall not fall more than 3 feet during the dry season from evaporation, lockages, and filtration, and therefore with that plan any stealing of the water supply by seepage must be prevented at any cost. For those reasons the company limited the head acting on the dam to 56 feet ordinarily, with a maximum of 66 feet above the bed in floods. With that pressure all serious difficulty disappears, for provision is made, even in the case of failure to properly operate the regulation at Alhajuela, to allow the full flood volume to escape at Bohio without injury to the dams or locks there.

The CHAIRMAN. Do you locate the Tertiary formation above or below the bottom of the canal in the Culebra cut?

General ABBOT. That is a question of geology, and I am not a geologist. The question of geology on the Isthmus is an extremely complicated one.

The CHAIRMAN. You spoke of the tertiary formation, and I supposed you knew what you were talking about.

Senator HANNA. He was talking about the dam.

General ABBOT. I know what the material underneath the dam is, from what has been told us by our geologists, and I assume that they know. The geologist whom I have personally in mind is Mr. Bertrand, a member of the Corps des Mines, lecturer on geology at the Higher School of Mines, at Paris, and a member of the Institute of France. He is an eminent geologist.

The CHAIRMAN. I do not care to prosecute the inquiry. I beg pardon for interrupting. It struck me that I should like to know.

General ABBOT. I was saying that by lowering the head of water acting on the dam by 25 feet, and not caring about any little filtration that may work through there, we do away with all the difficulties at the Bohio dam and all the difficulties incident to two lifts of 45 feet. We overcome both those difficulties, and I have no doubt myself that when the canal is constructed the engineers in charge will modify the preliminary plan of the Canal Commission accordingly. They will have time to go into details and they will make those changes.

Senator HANNA. You consider both routes, both plans, feasible?

General ABBOT. I consider both feasible.

Senator HANNA. Do you consider that a masonry dam at Bohio is a feasible plan?

General ABBOT. No, sir; and that is not proposed by anybody. No one proposes a masonry dam there. The original plan of the commission contemplated masonry, but they modified it to an earthen dam with a core wall of masonry.

Senator HANNA. A core—that is what I mean.

General ABBOT. That is not a masonry dam. That is an earthen dam with a core wall.

Senator HANNA. Do you consider that a feasible plan?

General ABBOT. Yes, it is feasible, I think, but it approaches the limits of uncertainty, because we have no experience in operating pneumatic caissons under a head of 128 feet.

Senator HANNA. The suggestion was made, I think, by Colonel Ernst, or two or three other engineers, that although 128 feet is a lower level by some 12 or 15 feet than pneumatic work has ever been done before, yet that by pumping out the waters they could reduce the head and lower the level.

General ABBOT. Yes, that is true.

Senator HANNA. So that it would bring it within the limit of past experience. Is that right?

General ABBOT. Yes; I indorse fully the practicability of the canal commission plan. I am only suggesting these points. I recognize the eminent character of these engineers, and I am very sure their views will command confidence with the profession. I am only pointing out the objections which have been raised here against this plan, and which I believe a more thorough study and revision will enable them to eliminate; and therefore I say those objections are not chargeable against the route of the Panama Canal.

The CHAIRMAN. But you adhere to the belief, as I understand you, that the plan of the technical commission is the better plan?

General ABBOT. I regard the plan of the technical commission as obviating these objections of more or less weight, which have been raised here against the canal commission plan. The plan of the technical commission was a plan prepared for a private company, with a view of giving them, at the minimum cost, a canal capable of meeting all the demands of commerce at the present time and for the next fifty years. That was the basis on which we worked.

Senator HARRIS. You still think it is the better plan?

General ABBOT. I do not say that I would not enlarge the bottom width and increase the depth, if the United States Government has the money to spend to make it larger. Our company contemplated a canal 30 feet deep. The Commission contemplates 35. Thirty-five is better than 30, if you have the money to secure it. Thirty feet meets all the demands made upon us by commercial houses and ship constructors, the men with whom we had the correspondence. They thought 30 feet would be ample for fifty years, and we made provision to deepen the canal subsequently in case we should ever want a greater depth and width. The plans of the comité technique were made for a private company, where dollars and cents were important considerations. The plans made for the United States are under different conditions, and perhaps it would be desirable to spend more money and get a better canal in the first place than it would be to ultimately reach those dimensions when commerce demands it. So that I would not

put the technical commission's plan in opposition to the American plan, but I would simply say that I believe a more thorough study will eliminate all the objections in the American Commission's plan for the Panama route.

Senator HARRIS. You alluded to the question of the locks just now, and indicated that the comité technique preferred locks of about 25 feet lift.

General ABBOT. Twenty-nine and a half, or, say, 30 feet.

Senator HARRIS. What would be your plan to avoid this flight of locks which the Commission recommend, with their enormous wall there?

General ABBOT. A flight of locks there is impossible to avoid.

Senator HARRIS. They have got 80 feet in the middle, resting on a wall 45 feet high, with a free board of 4 feet. That would make that enormous wall there—

General ABBOT. Their lifts are much larger than ours.

Senator HARRIS. Thirty-five feet and 45 make 80, with a free board of 4 feet more added to it, which the wall would have to have, at least.

General ABBOT. That would be a large mass of masonry. When you reduce that elevation by 25 feet you get much less.

Senator HARRIS. I was anxious to know how you could avoid that.

General ABBOT. By adopting the lesser lift, instead of going up 45 feet making it but 30.

Senator HARRIS. Then you would have a greater number of locks?

General ABBOT. No; instead of going up a total rise of 80 feet we would only have a total rise of 60 feet.

Senator HARRIS. Then that means more excavation, bringing the level down lower?

General ABBOT. No; it means a less level of Lake Bohio above the lower level.

Senator HARRIS. Then that means more excavation at Culebra?

General ABBOT. Oh, yes; it means more excavation, certainly. I thought you had reference to the location at the dam. Certainly, it would mean considerably greater excavation at the Culebra, but the greater excavation there is balanced by improved conditions at the dam.

Senator HARRIS. That is, you would rather undertake 10 or 15 feet more excavation up there and reduce the height of these locks. That is your proposition, to balance the two.

General ABBOT. Yes, I would reduce the lake level, and with it the height of the locks and the pressure on the gravel and sand strata below the clay bed at the dam, at the expense of deeper excavation at the Culebra. If you put a 90-foot pressure on those strata underneath the clay at the dam a masonry core wall may be advocated by some engineers, although Mr. Morison does not regard it as necessary.

Senator HARRIS. The whole pressure of the floods which you describe will practically come down and affect this masonry here?

General ABBOT. No, sir; there is no flood that reaches this point. You know the water enters the canal at Obispo and spreads out into the lake, and it only develops a static pressure at the dam.

Senator HARRIS. Yes; but the head of water is 90 feet?

General ABBOT. Yes; but that is only a static pressure.

Senator HARRIS. The higher the level the greater the pressure on the dam and the gates?

General ABBOT. Yes.

Senator HARRIS. I should like to ask another question there——

General ABBOT. Let me say one thing in connection with this. In this method of arranging locks in flights there is this great advantage, that the time of passage through the lock is less than it is where you have separate locks.

Senator HARRIS. But in each chamber it takes the same time?

General ABBOT. No, sir. Now, we will consider that a ship is coming at her full speed in the canal. Her first loss of time at the lock is caused by the necessity of reducing speed; but perhaps I had better leave that for the present and discuss that point more fully later.

Senator HARRIS. I was going to ask you whether it would not be advantageous to have a basin between those two locks.

General ABBOT. The answer I will give will cover that ground. I will come to it later.

Senator HANNA. Go ahead, General.

General ABBOT. I think that I have covered what I wished to say. I wish to have it very distinctly understood that the American Commission had an immense subject to consider, covering the Nicaragua, the Panama, and all other possible routes, and, being under great pressure as to time, so as not to delay the commencement of actual work on the canal, I think it is not fair to consider that they have studied the plan with the detail which they would have given to it if they had been called upon simply to plan the best possible canal that could be built through this Panama route, and had been given plenty of time to do it in. I think, therefore, that it is not fair to criticise their plan as a final one, or to raise against it objections which engineers can see may easily be obviated by modifications; and I think they should be given the benefit of the belief that when the final plans are made they will be modified sufficiently to meet these objections.

The CHAIRMAN. What pressure is it that you refer to that they were under?

General ABBOT. I mean to say the public demand for an isthmian canal without waiting for unnecessary loss of time in the preliminaries. The people want a canal as soon as possible.

The CHAIRMAN. That Commission was in the field under organization for two years and a half.

General ABBOT. Yes.

The CHAIRMAN. And spent two weeks in Panama.

General ABBOT. Yes.

The CHAIRMAN. Now, where was the pressure?

General ABBOT. The pressure I had reference to came on the part of the American people for having a bill passed appropriating money and beginning the immediate construction of the canal.

Senator HARRIS. You mean it was a pressure of time?

General ABBOT. A pressure of time; yes. They all perfectly understood that the Congress and the people were both desirous of having prompt action in this matter.

Senator HANNA. Well, General, the time spent by the commissioners on that Isthmus was not the important feature of their work. They had subordinates to do all the preliminary work, and they made their plans from the report of those people and the facts as developed by their employees.

General ABBOT. Their business was to see that they acquired accu-

rate information and then to study it up in the office. It was the matter of studying it up in the office which was hurried by the urgent necessity for reaching conclusions promptly.

Senator HANNA. To make an early report.

General ABBOT. They sought a practicable plan. They found a practicable plan. That does not say that they could not have improved it if they had had two years more.

Senator HARRIS. Do you think two years more would have been a benefit?

General ABBOT. I think it would in a great work of this kind. I think there is no better illustration of this fact than the failure of De Lesseps. De Lesseps started in and began his work without making the necessary investigations on the ground. He thought he could safely begin the building of a canal at once, and the result was a very disastrous failure. I think that in the case of a great public work money is saved by devoting time to the preliminary investigations.

Senator HARRIS. He gave it but a few months' preliminary investigation?

General ABBOT. Yes.

Senator HARRIS. These gentlemen had two years?

General ABBOT. Well, the Isthmian Canal Commission have doubtless collected all the information they could in the time they had; but with more time for studying their data they might have avoided some of these difficulties which have been suggested in the statements of witnesses before this committee.

Senator HANNA. Have you ever been over the route of the proposed Nicaragua Canal?

General ABBOT. I passed through Nicaragua, sir, many years ago, landing at San Juan del Sur, going over the divide to Virgin Bay, and passing through the lake and down the river to Greytown.

Senator HANNA. Have you made any study of the reports of the surveys at different times?

General ABBOT. Yes; I have carefully studied the Ludlow Commission report, and the Walker Nicaragua Commission report.

Senator HANNA. So, from an engineering standpoint, you are perfectly familiar with those surveys?

General ABBOT. I am familiar with them as far as those reports are concerned.

Senator HANNA. Without discussing the relative physical conditions of the two routes, with reference to the operation of a canal after one was built, what have you to say as to that, with reference to the two routes?

General ABBOT. If the committee will allow me, I have prepared a careful discussion of that question, taking as a basis the Isthmian Canal Commission report, to show the relative advantages and disadvantages of the two routes, adopting their figures and their facts. It is not very long, and if the committee will permit me I will read this.

The CHAIRMAN. You had better insert it. We have all read it. It is the same discussion that has been circulated through the newspapers throughout the United States, is it not?

General ABBOT. Well, sir, I do not know. It was published in Collier's Weekly.

The CHAIRMAN. We have all seen that. You may just insert that.

General ABBOT. That gives my views in regard to that subject.

The matter referred to is as follows:

It would be premature, pending the publication of the appendixes and maps of the final report of the Isthmian Canal Commission, to attempt to study in detail the two projects submitted; because this report, for reasons of brevity, only treats the engineering problems of construction in a general manner.

We may, however, adopt the two projects formulated by the Commission as a basis for comparison, form from them an idea of the commercial merits of the two routes, and thus reach a conclusion as to which ought to be secured by the United States. The following table contains some of the more important elements to be considered in such a study:

	Num- ber of locks.	Length in miles in—					Curvature.	
		Harbors.	Canal.	River.	Lake.	Total.	Degrees.	Miles with radius less than 5,905 feet.
Panama.....	5	6.79	28.69	2.61	11	49.09	772	0.82
Nicaragua.....	8	3.07	60.44	49.64	70.51	183.66	2,340	24.55

Each item in this table has its significance, and is worthy of careful consideration in turn.

It is universally admitted that a sea-level canal is superior to one with locks, and the nearer this standard can be approached the better is the canal. Although modern locks are much less objectionable than those of the ancient pattern, they are still likely to cause delays when the traffic is large, and Panama here has clearly an important merit as compared with its rival.

As it is fair to assume that navigation in the harbors at the entrances will be subjected to no inconvenience, and as the total length of the canals is estimated from the distance between the 35-foot contours in the two oceans, Panama has here an advantage of about 4 miles, which represents a relative gain of about 9 per cent of its estimated length.

The length of transit in the canal proper, shown in the fourth column of the table, indicates a decided merit for Panama, as the distance is less than half that of its rival.

It is, however, in the river section that the popular estimate is most at fault. Those who have never seen the San Juan River probably imagine it to be, like the Mississippi, an inland sea easy of navigation. The Commission paints it in very different colors. The report states: "It is very crooked, the curves being so sharp in places that the natural channel, even if deep enough, would be difficult for large ships to navigate. Cut-offs have been located in such places, improving the course of the channel and reducing the sailing distance. These improvements leave 54 per cent of the total distance from the dam to the lake in curvature. Except in a few cases the radius exceeds 5,000 feet, but in the section between the Machuca and Castillo Rapids the limit was reduced to 4,045 feet." The significance of these curvatures, which are less than those imposed by actual experience at the Suez Canal, will be considered further on. It is also to be remembered that these 49.64 miles (more than the whole length between oceans at

Panama) must carry the entire outflow from the lakes, augmented from the river Sabalos and other smaller tributaries by an inflow estimated by the Commission to attain at times, under the influence of heavy rainfalls, possibly a volume of 50,000 cubic feet per second.

The wasteways projected near the dam at Conchuda are designed to carry 100,000 cubic feet per second. Ships will therefore be liable to encounter varying currents, not perhaps of serious import in a straight channel but dangerous in rounding so sharp curves. To add to the difficulty, the gorge traversed by the river is often swept by strong trade winds, which blow in nearly every month of the year, and fogs are said to be by no means rare. Manifestly this long river section, which has no counterpart at Panama, will count largely in fixing the insurance rates for passing the canal.

We come now to the consideration of the lake section, and the regulation of its level, about which there is much misapprehension except among professional engineers. The Commission devotes more than 13 pages to the discussion, and is careful to explain that the lack of precise records gives more or less uncertainty to its conclusions.

The problem is too complex to be considered here except very briefly. The outlet is necessarily 52.9 miles from the lake, and a navigable depth of 35 feet must always be preserved throughout this distance, a condition which fixes the minimum lake level at 104 feet above tide. The desired maximum is 110 feet, but exceptionally it may attain 112 feet. The computations to effect this regulation are, in the words of the Commission, "based essentially on the assumption that the rainfall on the entire lake basin is in direct proportion to that at Grenada, while in fact the average rainfall over the whole basin should be used. There are not sufficient data of observation to establish such a relation, and the assumption is provisional only. It leads to the best method of procedure available, but the conclusions reached may obviously need modification in either direction as the rainfall record and observations of the late elevations are extended."

The extreme natural fluctuation of the lake is "not definitely known," but is taken at about 13 feet, giving elevations above tide ranging from 97 feet to 110 feet. If the regulated lake should fall below a level of 104 feet, navigation would be interrupted, and if it should rise above 110 feet, valuable property on the west shore would be flooded and damages would naturally be demanded. "The experience and judgment of the operator are essential elements in the effective regulation of this lake." No such difficulties are presented at Panama, where "the regulation is automatic." But this uncertainty is not the only difficulty presented by Lake Nicaragua. Nature has not only imposed a definite summit level upon the engineer, thus depriving him of the precious privilege of selecting the one best suited to the canal, but has left this level subject to a never-ending conflict between three natural agencies—rainfall, evaporation, and outflow.

The first two are liable to variation with the passage of years, and may ultimately bring about a change in this fundamental datum of the canal. Indeed, Professor Heilprin believes that a study of the earlier surveys indicates a progressive lowering of the lake level, which, if it rested on precise observations, would condemn the route definitely. Moreover, sudden changes are not impossible. The lake lies in a district specially subject to volcanic action. Geologists agree that formerly it formed an arm of the Pacific, and that its separation and present elevation of about 100 feet resulted from an ancient convulsion.

As recently as January, 1880, Lake Ilopango, only about 200 miles distant, was lowered more than 40 feet by an irruption in its midst. Lake Nicaragua has one active volcano on an island close to the proposed track for shipping, and there are three others near by; and such an occurrence would effectually destroy any possible canal even if completed. At Panama there are no volcanoes within about 200 miles, and have been none since the Miocene epoch, and the danger of earthquakes there is claimed by competent geologists to be much less than in Nicaragua. This relative exemption is not only indicated by geological facts and early historical records, but is confirmed by observations of earth tremors recently taken with delicate seismographs.

Such observations were begun in January, 1901, at San Jose de Costa Rica, not far from Greytown, and in ten months forty-three tremors were noted, of which eight were sensible shocks. During the past eighteen months similar observations have been in progress at Panama, and the instruments, two in number, have recorded only five, of which only one was strong enough to be perceived by the inhabitants. Evidently the terrain traversed by the projected route in Nicaragua is less stable than that at Panama, and it would seem wise to take advantage of the fact in selecting the route for purchase.

But difficulty of regulation is only one of the evils of having a vast inland sea for the summit level of the canal. Strong winds often sweep its surface, causing considerable waves at the two interior ports, and thus adding to the delays of navigation. Moreover, these waves bring mud to the Fort San Carlos shore, which causes shallow water there, extending far out into the lake.

In the 70 miles credited to lake navigation in the above table the Commission reports that only about 42 miles lie below the grade of the canal bottom, adding: "The remainder, 28.73 miles, will require excavation. * * * The bottom from Fort San Carlos to deep water in the lake consists of soft mud 6 to 17 feet deep, underlaid by hard clay and sand. The mud is so soft in places that it is difficult to determine its surface. The steamboat navigating the lake pushes its way through several feet of it when the lake is low. This material will take a flat slope, and after a channel is excavated through it there will be some expense for maintenance." Thus only about 42 of the 70 miles of the lake section are suited to the much-vaunted ocean speed of transit.

It remains to consider the curvature shown in the above table. This element is a matter of the first importance, both as to speed and as to safety in transit. Experience on the Suez Canal has compelled a costly increase from a minimum radius of 700 meters (2,303 feet) to 1,800 meters (5,905 feet) since it was opened to navigation. It will be noted that the Nicaragua project includes 24.55 miles, or over 22 per cent of the total canal-river distance, handicapped with more abrupt curvature than experience has shown to be necessary for easy transit. The Panama project shows less than a mile below the standard, and this lies at the Colon entrance, where the width ranges from 500 to 800 feet. Its superiority in this respect is too important to require comment. The great surface exposed to the action of the wind by a modern ocean steamer renders steering difficult and hazardous when it blows from the side or astern. The Manchester Ship Canal contains some objectionable curves, and no large ship passes through it without having two tugs, one ahead and the other astern, to aid in steering, although the ship moves wholly by its own power.

There are other matters proper for consideration, as affecting the

completed canal, when comparing the physical features of the two routes. Such, for example, is the rainfall which, by obscuring vision, especially in the bad curves, would be likely to delay passage. The Commission states: "Along the Atlantic coast in the vicinity of Greytown and for some distance inland the rainfall is the greatest known on the continent. There is no definite dry season. Rain may be expected almost any day in the year. On the other hand, the entire drainage basin of Lake Nicaragua lies in a region having a well-defined dry season. The annual rainfall near Greytown sometimes amounts to nearly 300 inches; the average is probably 260 to 270 inches. * * * There is a perceptible diminution in the annual rainfall as one proceeds westward to the lake. * * * In the drainage basin of Lake Nicaragua the average annual rainfall is about 65 inches." At Colon, the observations of the Panama Railroad Company, covering nearly half a century, give a well-established average of about 130 inches annually. On the line of the canal, in the interior, it is about 94 inches, and on the Pacific coast 57 inches.

The objections to Greytown as a permanent port of entry are well known. The Commission states: "A fine harbor once existed at Greytown with about 30 feet of water at the anchorage and in the entrance. * * * A study of the various maps of Greytown from the earliest to the latest reveals, it is believed, the processes by which natural forces acting on the movable sands composing the delta of the San Juan River have formed successively in ages past harbors which were afterwards converted into lagoons or lakes. The process seems to be still going on, and Greytown lagoon is the latest development." We have ample experience in the difficulty of improving harbors on our sandy coasts, but at no locality have we ever encountered conditions so unfavorable; and the most careful estimates of cost, both for construction and for maintenance, may well prove to be at fault at such a locality. Why not avoid all uncertainty by selecting Colon, a harbor which has met all the needs of a large commerce for hundreds of years?

It only remains to consider the probable costs of transit, which after all furnish the true standard for gauging the merit of the two routes. The Commission, without explaining in the part of its report already printed how the figures were reached, states: "The estimated annual cost of maintaining and operating the Nicaragua Canal is \$1,300,000 greater than the corresponding charges for the Panama Canal." This sum must be paid by the ships passing the canal, constituting an annual imposition on the commerce of the world, unless we are prepared to liquidate it by an annual taxation of the American people.

The subject has been more elaborately considered in a paper read before the Washington Geographic Society by Mr. A. P. Davis, the hydrographer of the Isthmian Canal Commission, on November 29, 1901. He applied the same standard of estimate to both of the canals, and his conclusions are summed up as follows:

"Sailing vessels to and from the north, or, say, 5 per cent of the total traffic, would prefer Nicaragua; steam vessels from Gulf ports to the west coast of North America, or perhaps 25 per cent of the total, would prefer Panama, but might use either route with nearly equal advantage; while all the rest, or 70 per cent, would much prefer Panama, and the traffic to and from the west coast of South America in steam vessels, or about 30 per cent, would by way of Panama save

an average of nearly 400 miles in distance and 36 cents per ton—always assuming that these are based on expenses.”

In other words, every 3,000-ton steamer would have to pay in transit charges alone \$1,080 more for passing a long and hazardous canal in Nicaragua than for a short and easy passage by Panama. But this sum would not cover the entire disadvantage. As has been shown above, much higher insurance rates for passage would rule via Nicaragua than via Panama, and this tax could not be avoided even if the United States should open a free canal at the expense of the nation.

Senator HANNA. As a summary of your views, do you agree with the report of the Commission that the offer made by the Panama Canal Company to dispose of their property for \$40,000,000 would be of advantage to this country to make that purchase in preference to entering upon the construction of the Nicaragua Canal?

General ABBOT. Yes; I think the Government could afford to pay a good deal more than that with material advantage.

Senator HANNA. How much more?

General ABBOT. I have not estimated that in dollars and cents, but I think we certainly might have afforded \$70,000,000 or \$80,000,000 and still have it vastly to the benefit of the United States to secure this route. That is my opinion as an officer of the United States Government, not as an agent of the company.

Senator HANNA. I should like to know some few reasons for your coming to that conclusion.

General ABBOT. Well, sir, the fact is this, that nature has given to that route advantages which if utilized will practically control the traffic of the Isthmus.

The CHAIRMAN. Allow me to interrupt you there, because we have been discussing another route, the Darien route.

General ABBOT. Yes.

The CHAIRMAN. Some people say that nature has done the most for that route.

General ABBOT. Well, I do not like to go into an imaginary matter of tunneling a mountain of unknown material with data based on a survey dating fifty years back. I can not discuss a matter of that kind. I can only speak of what we know. We do know about these two routes.

The CHAIRMAN. Then the Darien route would not be practicable?

General ABBOT. Not at all, sir, in my judgment, at any reasonable expense.

Senator HARRIS. Have you ever given any attention to the various explorations made at San Blas or Caledonia Bay, or any of those places?

General ABBOT. I have never studied it seriously, in any detail. I only know that the Commission developed the fact that immense ship tunnels would be unavoidable through material which is not certainly known, but which, from what I know of the Isthmus, is highly unlikely to be good granite.

Senator HARRIS. So far as you know it is absolutely unexplored?

General ABBOT. In my mind the whole thing is a visionary scheme. I see no reason for not adopting the conclusion of the Isthmian Canal Commission that those routes are absolutely impracticable at any reasonable expense and are unworthy of consideration in connection with these two routes.

Senator HANNA. Go on with your statement.

General ABBOT. There are two other subjects which I think are worthy of the attention of the committee—the health question and the river Chagres.

Nobody claims that the climate of Panama, or of any tropical region, is conducive to health for natives of more northern climes, but the dangers and difficulties at Panama have been enormously exaggerated, and I thought it might be interesting for the Commission to have some absolute statistics on which they could depend. When I was at the Isthmus I visited Dr. Lacroisade, who is the medical director of the new canal company hospital at Panama, an admirable hospital built on a high hill back of the city, with fine buildings, and with the Sisters of St. Vincent de Paul as nurses. We saw Dr. Lacroisade and we got from him, in tabular form, a statement covering the whole subject, so far as the canal records go. These statistics are printed in France, but they are not probably known in this country, and I brought them and should like to make them a part of my testimony.

These statistics begin in 1881, when the old company began the work, and extend from that time down to June 30, 1898, when Dr. Lacroisade made the report for us. Since that date I have taken the figures from the annual reports of the board of directors to the general meeting of the company, so that everything I offer is strictly official.

In the first place, Dr. Lacroisade gives the effective force employed in each year. He then gives the corresponding percentage of disease, taking into consideration, first, the diseases of Europe or temperate regions, and second, those due specially to the climate of Panama. He then gives the percentage of deaths resulting from the diseases of Europe, and deaths resulting from the diseases due to the climate of Panama. He has stated them in percentages. Here we generally reckon by the number of deaths in a thousand.

In the table I have left the French figures exactly as the doctor gives them, but in referring to them shall move the decimal point one place. This will be more intelligible, as conforming to our American method of considering death rates. By an examination of this table you will see that the deaths in 1881, due to diseases of Europe, were 19 per thousand; in 1882, 22 per thousand; in 1883, 22 per thousand; in 1884, 26 per thousand; in 1885, 17 per thousand; in 1886, 17 per thousand; in 1887, 22 per thousand; in 1888, 18 per thousand. The mean for the eight years was 20.5 per thousand.

That was during the period of most serious sickness. During the operations of the new company, since 1895, the deaths per thousand due to the diseases of Europe were, in 1895, 20; in 1896, 21; in 1897, 20; in 1898, 20; in 1899 and 1900, 27; in 1900 and 1901, 22. The mean for the six years is 21.6 per thousand.

In other words, these figures for the deaths caused by diseases of temperate regions remain sensibly constant. The mean for the old company was 21 per thousand and the mean for the new company is 22.

Senator HANNA. That means 21 out of a thousand?

General ABBOT. That means 21 out of a thousand. Those deaths were not due to the climate of the Isthmus, but are the ordinary diseases which are found everywhere.

Now we will look at the deaths due to the diseases of the isthmian climate. First, I will read down through the period of the old company.

In 1881, 47 per thousand; in 1882, 44; in 1883, 45; in 1884, 41; in 1885, 38; in 1886, 34; in 1887, 40; in 1888, 25. Mean for the eight years, 40 per thousand.

During the operations of the new company they were, in 1895, 9 per thousand; in 1896, 8; in 1897, 10; in 1898, 8; in 1899 and 1900, 1; in 1900 and 1901, 3. Mean for the six years, 7 per thousand. Showing a most astonishing diminution in the rate of deaths due to malarial and other injurious influences of the climate.

The CHAIRMAN. Whose report is that you are reading from?

General ABBOT. Those are figures which were given us officially when the French commission visited the Isthmus in 1898 to collect all the information we could with reference to the work in progress.

The CHAIRMAN. That is information furnished you by the old company?

General ABBOT. Information furnished to us by Dr. Lacroisade, medical director of the company, now in charge of the hospital at Panama, who has resided there for many years. I saw him personally and visited his hospital. Everything is managed as well as in any hospital in the United States, and I think that the figures are absolutely trustworthy.

The CHAIRMAN. All these reports you have read come from him?

General ABBOT. They come from him; yes.

The CHAIRMAN. That is what I wanted to know.

General ABBOT. They come from him excepting those of very recent date, since 1898. Those I have taken from the official reports of the board of directors to the company, made annually to the general meeting. That is a practice they have in France.

The table referred to is as follows:

Official health statistics of the Panama Canal.

Year.	Effective force employed.	Percentage of disease.			Percentage of mortality.		
		Diseases of Europe.	Diseases due climate.	Total.	Diseases of Europe.	Diseases of climate.	Total.
1881.....	928	21.02	42.02	63.04	1.94	4.74	6.68
1882.....	1,910	18.85	47.64	66.49	2.21	4.39	6.60
1883.....	6,287	23.24	42.62	65.86	2.20	4.46	6.66
1884.....	17,615	27.58	36.95	64.57	2.58	4.08	6.66
1885.....	15,215	11.93	49.14	61.07	1.73	3.79	5.52
1886.....	14,935	14.01	43.88	57.89	1.67	3.43	5.10
1887.....	16,217	21.82	39.25	61.07	2.22	3.99	6.21
1888.....	13,725	12.17	40.46	52.63	1.81	2.54	4.35
Means.....	10,854	18.83	42.75	61.58	2.05	3.92	5.97
1889.....	1,826						
1890.....							
1891.....							
1892.....	{ About 800 }						
1893.....							
1894.....							
Means.....	971			49.68			2.88
1895.....	1,225			49.95	2.05	0.89	2.94
1896.....	2,715			39.91	2.08	0.84	2.92
1897.....	3,980			51.85	1.99	1.00	2.99
First half 1898.....	3,630			48.70	1.98	0.82	2.80
1898-1899*.....							
1899-1900.....	2,200				2.68	0.09	2.77
1900-1901.....	2,000				2.20	0.30	2.50
Means.....	2,792			47.60	2.16	0.66	2.82

*This year continues to show reduced disease and death rates, both climatic and total.

The CHAIRMAN. Do these statistics include the deaths on the railroad during the same period of time?

General ABBOT. No, sir; I will come to that a little later. I can not give you so complete information about the railroad, but what I have I will give you. First, I will read a note which I have prepared to this table, giving Dr. Lacroiside's conclusions:

"These statistics, to June 30, 1898, are reported by Dr. Lacroiside, the medical director of the New Panama Canal Company, and are based on the hospital records. The subsequent statistics are taken from the official annual reports of the new company. Dr. Lacroiside's conclusions, after a residence of many years on the Isthmus, are the following: The Central American negroes, and especially those of the West Indies, resist its effects best, owing to their better endurance of the direct rays of the sun, to their relative immunity from malarial influences, and to their absolute immunity from the yellow fever. Hindoos, Chinese, and native Africans suffer more and, engaged in hard work, yield readily to beriberi, of which they have brought the germs. Europeans can resist the climate, on condition of abstaining from severe manual labor.

"Of 254 officers and agents sent by the old company between January 1, 1881, and August 31, 1883, and thus exposed to the early conditions, 40 died, indicating a percentage per annum of 7.20. Of the 89 agents sent by the new company in the first three and a half years only 3 died. He attributes the undoubted improvement of health on the isthmus to better accommodations of the laborers, to better drainage, and especially to the fact that the excavations have reached a level below the poisonous emanations of decaying organic matter. The period of serious sickness always to be expected at the beginning of extensive excavations in tropical regions has already been passed at Panama."

The logical deduction from these facts and figures is that the excessive mortality due to disturbing virgin soil in the Tropics remains to be encountered in Nicaragua, but has been gone through with at Panama, and we may now assume that a normal state of health will prevail there if proper sanitary regulations are enforced. The following figures from a recent official report of Major Gorgas, M. D., upon the health of Habana sustains this view. The average death rate for eleven years was 48 per thousand; the maximum was, in 1897, 106 in a thousand. The minimum was in 1900, when 21 per thousand died. During 1901, 19.58 died, which, the doctor says, "compares very favorably with leading civilized countries." I have here some further figures which bear upon this question.

The CHAIRMAN. Where did you get those?

General ABBOT. I found them among some old memoranda.

The CHAIRMAN. I do not think it is better for the committee to indulge in this.

Senator HANNA. He wants to show the comparative health of Panama in its present condition with the other cities of the world.

The CHAIRMAN. But he is not referring to any official data at all.

General ABBOT. No, sir; these figures are not official.

The CHAIRMAN. But to figures which he has picked out of newspapers.

Senator HANNA. If you object to it, never mind.

The CHAIRMAN. We can all read the papers and get all the information which they can give us.

Senator HANNA. Right there, General, I understand that your judgment is confirmed by these figures and these data, that in the construction of the Nicaragua Canal you would have to go through pretty much the same conditions, in the turning up of the soil, until you reach a depth below which malarial diseases will be induced.

General ABBOT. I have very little doubt of it. The Commission state the same belief in their report; and I think that anyone who is familiar with work in tropical regions knows that as soon as the surface soil is disturbed extensively diseases which did not exist before are likely to be developed. I remember very well in the early days when Illinois was considered a terrible region for chills and fever.

Senator HANNA. It was, too.

General ABBOT. But that has passed away with the settlement and occupation of the country.

Now, I will offer all that I have been able to collect with reference to health on the Panama Railroad. There was a fearful loss of life during the construction of the railroad. I passed over the route in 1855, just after it had been finished. The surgeon of the steamer had been employed on the line, and he told me much about it. He said the conditions were something frightful—that they had to contend not only with disease, but with suicide. A great many coolies had been imported, and they were very unhappy and wanted to get back to China. They had an idea if they committed suicide they would go back. The surgeon said it was necessary to watch them with the greatest care; that if a Chinaman found a little puddle of water he would hold his face down into it until he drowned, without exciting the attention or notice of anyone. The excessive death rate was due, doubtless, not only to the climate but also to the conditions, and to the various races that were tried. It was not then known that the heavy work should be done by negroes. I have no idea that anything like the mortality then encountered will be repeated on any isthmian line.

The CHAIRMAN. You never heard of a Chinaman committing suicide in Washington, did you?

General ABBOT. I do not think conditions in Washington would induce one of them to commit that act. I will now give the best information I have been able to obtain on the subject of diseases and death in recent times on the railroad. I will read an extract from a letter from the second vice-president of the Panama Railroad, Mr. Drake:

“I write concerning the mortality of the Isthmus within recent years among employees of the Panama Railroad”——

The CHAIRMAN. What is that you are reading from?

General ABBOT. This is from the second vice-president of the Panama Railroad Company, Mr. Drake. This is an official document from him.

The CHAIRMAN. He was here the other day and examined before this committee.

General ABBOT. Perhaps he may have said these very things, but he gives some figures.

The CHAIRMAN. We have his testimony.

General ABBOT. This will only take a minute to read; it is very short:

“I write concerning the mortality in recent years among the

employees of the Panama Railroad, to say that upon careful investigation we find that we have a monthly average of 266 men upon our gold pay roll, mostly foreign, about equally divided as to color, and that among the white employees from the United States, resident on the Isthmus, during the last five years, there have been 12 deaths, from various causes; none, however, from yellow fever, and 1 by suicide."

The CHAIRMAN. He stated all that here in his testimony.

General ABBOT. That gives nine per thousand. Mr. Drake further writes:

"We have an every monthly silver pay roll of 1,450 men, mostly colored, in constant service, which, as the time is divided into half days, is drawn from a force of fully 2,500 men. During the same period of five years there has been no serious epidemic in this force, or abnormal mortality. From among this force there are always patients in the company's hospital, on account of disease or accident, numbering from five to twenty, but there are no records in this office as to the exact number of deaths."

The CHAIRMAN. One general question about all this information as to the health there: These reports that you have read are confined to the railroad and canal company's employees, laborers, or officers?

General ABBOT. They are given by the medical director in Panama, who is employed by the Panama Canal Company, and by the vice-president of the Panama Railroad Company, who is employed by the Panama Railroad Company.

The CHAIRMAN. What do they include? Do they include all the people in Panama and Colon?

General ABBOT. Oh, no, sir.

The CHAIRMAN. Or along the line; or do they include only the persons connected with the railroad and the canal?

General ABBOT. Only those connected with the railroad or the canal.

The CHAIRMAN. Do they include all those persons, or only such as went into the hospital?

General ABBOT. On the line of the canal the custom is, as the railroad runs parallel to it all the way, that as soon as a man falls sick they send him to the hospital on the cars. It only takes an hour or two, and they send him to the hospital rather than treat him anywhere else; so that all the people who are sick and can not work go right into the hospital and their names enter into these reports.

The CHAIRMAN. Have not a great many of them died without ever getting to the hospital?

General ABBOT. No, sir; not from what Dr. Lacroisade's statement says. It is perfectly clear on that point.

The CHAIRMAN. I did not hear any such statement in what you have read. Have you read it all?

General ABBOT. I omitted to state that these figures were given to me, or given to the Commission, as the official record of the causes of death of all the employees of the Panama Canal Company during that time.

The CHAIRMAN. I understand that.

Senator HANNA. With reference to the operation of this canal, or the respective routes, what have you to say practically as between the

Panama and Nicaragua routes, as to the passage of vessels and the operation of the canal?

General ABBOT. Well, I have this to say, that the comparison of the routes, in virtue of the distance——

Senator HANNA. And other conditions——

General ABBOT. And other conditions, are fully covered in that paper which I have filed. In connection with the comparison of the times of transit, however, I have this to say: It unfortunately happens that the full report of the Isthmian Canal Commission, with its appendixes and the maps, is not yet published and is therefore not available for study. Consequently, all that is accessible is the brief document which sums them up. In that summary the times of transit of the two canals are simply stated as twelve hours for Panama and thirty-three for Nicaragua. Now, I take great exception to the thirty-three hours for Nicaragua, and I do it for this reason: That not having their detailed computations I am compelled to accept my own figures and on them to base my conclusions. I offer here my estimate of the time of transit by the two isthmian canals, adopting the plans of the Isthmian Canal Commission and assuming a ship with a sea speed of 10 knots.

BASIS OF ESTIMATE.

- (1) Safe speed of raising or lowering ship equals 2.5 feet per minute.
- (2) Single lock: Loss in slackening speed at approach, in entering and making fast, in maneuvering gates, in unlashng and leaving dock, and in regaining speed equals 21 minutes.
- (3) Two locks in flight: Loss only thirty minutes, as one "slackening speed at approach" and one "regaining full speed" are eliminated.

These times are based on careful observations I made on a large ship passing through the entire Manchester Ship Canal.

Further, to prevent injury to the banks of ship canals, the regulation speed is usually fixed at 6.7 miles per hour.

On Suez Canal, in 1898, the average rate was 5.5 miles per hour. As much worse curves, winds, currents, and rainfall (obscuring view) are encountered in Nicaragua a speed of 5 miles is, I think, a liberal estimate. At Panama the conditions are more favorable even than at Suez, and regulation time is not excessive.

Panama Canal—Summit level 85 feet:	H.	M.
49.09 miles at regulation canal speed (6.7 miles).....	7	20
Loss in lockages, 2 flights of 2 and 1 single, $\frac{85 \times 2}{2.5} + 30 \times 2 + 21$	2	29
Add 20 per cent contingencies.....	1	57
Total time of transit, in hours	11	46
Nicaragua Canal—Summit level 106 feet.		
183.66 — 42 = 141.66 miles at 5 miles per hour	32	20
42 miles deep lake, at sea speed (11.5 miles per hour).....	3	39
Loss in lockages, 8 single, $\frac{106 \times 2}{2.5} + 21 \times 8$	4	12
Add 20 per cent contingencies.....	8	02
Total time of transit, in hours	48	13

I claim, therefore, that the comparative time of transit is for Panama 12 hours and for Nicaragua 48 hours, provided the ship can travel

both by night and by day. The Canal Commission made no provision for lighting the canal, and in my judgment the insurance for vessels navigating that crooked and difficult river by night would be so high that night travel will hardly be attempted.

Senator HANNA. Even if lighted by electricity?

General ABBOT. I doubt it even then. I do not believe with curves so much sharper than experience at Suez has shown to be admissible, and with the prevailing winds and the head currents, and with the frequent rainfall obscuring view, that large ships will attempt night passages. Small ships might, but large ships will fear the risks of accidents. That is my private opinion. If I am correct, two nights must be added, which brings the total time of transit up to sixty hours; that is to say, two days more will be required to pass through the Nicaragua Canal than through the Panama Canal. The claims that by reason of longer sea routes one day is gained from New York to San Francisco and two days from New Orleans to San Francisco via the Nicaragua route are thus fully offset by the longer time of passing the canal. If you accept my views on this matter, you will see that both gains are wiped out and that there is no advantage whatever in length of voyage from passing through a canal in Nicaragua. My times of transit through the canals conform to the usual rule that times are proportional to lengths; that is to say, the advantage due to the 42 miles of deep-lake route are neutralized by the greater difficulties of the rest of the route.

That is my judgment. Ships seeking the most favorable and economical way of crossing the Isthmus would prefer Panama to Nicaragua every time; for not only will there usually be a decided gain in length of voyage, but there will also certainly be a saving in insurance rates, which will be proportional to the increased risks, and these must necessarily be much heavier at Nicaragua than at Panama.

Senator HANNA. The Commission in their report mentioned the sum of \$1,300,000 as the difference in favor of Panama in the cost of operation and maintenance.

General ABBOT. Yes.

Senator HANNA. What is your estimate about that?

General ABBOT. Well, I have no opinion, because the data on which that is based are not given. When I have the appendixes, then I may have an opinion; but of course that amount capitalized means \$60,000,000.

Senator HANNA. \$65,000,000.

General ABBOT. \$65,000,000. I have one more statement about the Chagres River which I should like to give.

Senator HANNA. All right, General.

General ABBOT. There have been some very wild statements made here about the rise of floods in that river. One gentleman said that a rise of 52 feet in two hours was reported; and there have been expressions of doubt as to the possibility of the Chagres River being controlled. Now, I have had access to all the records, old and new, and I have spent months in investigating them; and from my own notes and from my investigations of these records I have been able to prepare an authoritative statement in figures showing the highest stage above low water, in feet, attained by the Chagres River at Gamboa during the season of rains since the year 1882, omitting the year

1889, when no observations were taken after the collapse of the old company, and 1896, when the records were unfortunately lost.

The CHAIRMAN. What witness do you refer to who says that this river has risen 52 feet in two hours?

General ABBOT. My impression is that Commander Young stated that it is so reported. I would not be positive as to that. I read those papers without taking the names. My object was to see what criticisms were made.

The CHAIRMAN. Do you mean that you read them out of the newspapers?

General ABBOT. No, sir; I read them in the statements that have been made before this committee.

The CHAIRMAN. You have examined the reports of the testimony?

General ABBOT. I have seen the reports that were made public—that have been given out.

Now, I give in this table, in the first place, in feet, the difference between dead low-water mark and the highest point reached in each one of the rainy months; that is, the eight months from May to December, inclusive. There is never any trouble in the other months. These figures give the maximum rise above extreme low water. For instance, if the river at the beginning of the rise was 2 feet above low water the rise would be 2 feet less than I have given it here. I will simply say that 16 or 18 feet is the ordinary limit of those freshets; and that the maximum flood height of record was 39.4 feet at Bohio and about 36.6 at Gamboa.

The CHAIRMAN. What year was that?

General ABBOT. That was in 1879, the year of the great flood, the extreme height was reached then.

Now, I have given also the number of little freshets which occur during those months. Taking them year by year the number in 1883 was 21, and then in the succeeding year the numbers were 23, 35, 40, 30+, 28, 34, 9, 24, 12, 25, 12+, 25, 8, 8, 12, 12, giving the average number of 21 in each year. That is, the average for seventeen years was 21 of these little freshets occurring each year during the eight rainy months.

Senator HANNA. That is the number of freshets?

General ABBOT. The number of freshets.

Senator HANNA. Not the number of feet?

General ABBOT. No, sir. I have also given the number of hours during each year when the river was above 10 feet. I consider that when the river is within 10 feet of dead low water it is innocuous; that is, in entirely ordinary conditions.

The CHAIRMAN. Who made that report?

General ABBOT. I made it myself.

The CHAIRMAN. From what data?

General ABBOT. From the data in the files of the company, the old files of the company, and the new files up to date. These data are taken regularly, recorded instrumentally on what is known as a fluvio-graph; and the figures are independent of any errors of observation, simply requiring the reading of an automatically printed scale, the adjustment of the instrument being frequently checked by reading the stand of the river on the water gauge. I have the most absolute confidence in these figures. In fact, I am sure that they are correct.

The table which contains much other data, not enumerated, is as follows:

Highest stage above low water, in feet, attained by the Chagres at Gamboa during the season of rains.

	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1890.	1891.	1892.
May.....		16.7	16.1	(*)	(*)	16.1	(*)	13.6	14.1	17.4
June.....		14.1	16.7	10.2	11.8	(*)	14.8	13.1	14.8	12.0
July.....		16.7	17.7	16.4	15.1	.....	(*)	14.8	16.1	16.7
August.....		13.8	15.1	18.0	11.8	16.4	12.2	13.1	(*)	16.1
September.....		14.1	13.8	18.0	15.1	23.3	15.4	16.1	(*)	(*)
October.....		10.2	15.4	11.8	15.4	.....	12.5	17.4	10.2	13.1
November.....	18.4	11.8	19.0	31.5	17.1	18.7	10.5	16.1	19.7	22.8
December.....	(*)	15.4	(*)	23.9	15.8	15.4	31.4	31.8	12.8	15.8
Number of freshets.....		21	23	35	40	30+	28	34	9	24
Hours above 10 feet.....		201	333	453	509	570+	588	818	116	279
Mean annual discharge, in cubic feet per second....								4,170	3,040	4,310

	1893.	1894.	1895.	1896.	1897.	1898.	1899.	1900.	1901.	Means.
May.....	16.4	10.9	(*)	.....	23.0	(*)	13.5	(*)	13.4	.....
June.....	(*)	(*)	15.9	.....	.....	(*)	10.1	(*)	10.1	.....
July.....	11.8	13.8	13.7	.....	.....	12.6	10.1	11.6	(*)	.....
August.....	13.9	11.8	12.9	.....	.....	10.3	16.2	13.5	10.3	.....
September.....	(*)	13.9	(*)	.....	.....	(*)	(*)	11.2	11.7	.....
October.....	(*)	12.5	17.1	.....	10.1	13.5	(*)	15.1	(*)	.....
November.....	13.1	14.1	.....	.....	12.7	16.9	14.8	11.9	20.9	.....
December.....	25.3	19.0	.....	.....	13.2	(*)	(*)	14.1	15.4	.....
Number of freshets.....	12	25	12+	.....	25+	8	8	12	12	21
Hours above 10 feet.....	220	263	53+	.....	151+	51	57	82	100	255
Mean annual discharge, in cubic feet per second....	3,600	3,780	3 070	3,070	3,180	3,000	2,580	2,330	2,400	3,210

* River did not attain 10 feet.

Summary of river stages, seventeen years, from May to December, inclusive.

Number of months in which records are lacking.....	8
Number in which river did not attain 10 feet.....	26
Number in which maximum ranged between 10 and 20 feet.....	93
Number in which maximum ranged between 20 and 25 feet.....	5
Number in which river rose above 25 feet.....	4

Total number of months..... 136

Summary (twelve years) of discharge in cubic foot-seconds.

Mean annual discharge.....	3,214
Mean discharge in rainy season (seven months).....	4,171
Mean discharge in January and May (intermediate).....	2,931
Minimum discharge in January and May (intermediate).....	1,413
Mean discharge in dry season (three months).....	1,165
Minimum discharge in dry season (three months).....	530

Most rapid rises on record—feet in ten hours.

	Feet.
Flood of November, 1885.....	17.4
Flood of December, 1888.....	19.7
Flood of December, 1890.....	24.9
Flood of December, 1893.....	12.5
Freshet of May, 1897.....	11.8
Freshet of November, 1901.....	14.1
Mean.....	16.7

The maximum height attained above low water in the last half century was reached in November, 1879, when the river rose 39.4 feet at Bohio, and about 36.6 feet at Gamboa. The above table shows how much this exceeded all subsequent floods. A freshet attaining 10 feet above low water at Gamboa discharges about 14,000 cubic feet per second; attaining 20 feet, about 35,000, and attaining 25 feet, about 47,000. In the flood of 1879 the discharge at Gamboa reached 73,000 cubic feet, and at Bohio 112,000 cubic feet. The plans of the company for regulating the Chagres River are based on the maximum flood volume on record (1879), and on the minimum volume during the three months of the driest season ever noted.

HENRY L. ABBOT.

Senator HANNA. I do not care to ask any more questions.

General ABBOT. Instead of there being any rise of 52 feet in two hours, as has been stated to the committee as reported, the maximum rise, so far as rapidity is concerned, occurred in the flood of December, 1890, when the water rose 25 feet in ten hours.

The CHAIRMAN. I do not recall any witness who said there was a rise of 52 feet in two hours.

Senator HANNA. I think that was the testimony of the naval officer.

The CHAIRMAN. He did not say that he knew it.

Senator HANNA. He said that it was reported.

The subcommittee at 12 o'clock and 10 minutes p. m. took a recess until 2 o'clock p. m.

AFTER RECESS.

The committee met at 2 o'clock p. m.

ADDITIONAL STATEMENT OF GEN. HENRY L. ABBOT.

The CHAIRMAN. You stated in reply to a question put by Senator Harris that you were in the employ of the Panama Canal Company now.

General ABBOT. Yes.

The CHAIRMAN. How long have you been in that employment?

General ABBOT. I joined the company as a member of the Comité Technique I think on the 1st of May, 1897, or about that time, and remained as a member of that Comité Technique until its final adjournment sine die, when we had completed our work, which I think was about the middle of the year 1900. I think it was; I am not quite sure about that date, but about June 30, 1900.

Since that time I have been employed as a consulting engineer with a view of expediting and forwarding the latest information to the Isthmian Canal Commission. They were here in Washington working up their report and they were desirous to receive full information up to the latest date. By my coming to America and receiving direct from the Isthmus the monthly reports relative to the Chagres River, and to the climatological conditions, and making the necessary studies of them, and forwarding the results to Admiral Walker, the time of crossing the ocean twice in the mail would be saved and the Isthmian Canal Commission would be better served.

The CHAIRMAN. At what time did you enter upon this new service that you speak of with reference to the Isthmian Canal Commission?

General ABBOT. Immediately after the adjournment of the Comité Technique.

The CHAIRMAN. About when was that?

General ABBOT. As well as I can remember it was the last of June,

1900. I joined in 1897 and have been in the service of the new company since that time, and the exact date when the Comité Technique adjourned sine die was the time when I became consulting engineer.

The CHAIRMAN. This Comité Technique was dissolved when they got through with their work?

General ABBOT. Yes; we finished our work and dissolved.

The CHAIRMAN. Were you the only member of the committee that was retained in the service of the company?

General ABBOT. As far as I know, I am; I do not know.

The CHAIRMAN. You were employed immediately, were you?

General ABBOT. Yes; I had been doing work for the company in Paris, in studying this Chagres problem. I had done a good deal of work in that way as a member of the Comité Technique, and had written a number of memoirs on the subject in the line of my duty. Being interested in keeping up the record of the Chagres River to date, the company wanted that work continued.

The CHAIRMAN. Do you recollect about what time in 1900, what month and what date, you arrived in New York from Paris?

General ABBOT. I arrived in New York from Paris late in October.

The CHAIRMAN. 1900?

General ABBOT. Yes.

The CHAIRMAN. You must have been here before that, because you testified on the 17th of January, 1899, before the committee of the House of Representatives.

General ABBOT. That was a special matter, for which I crossed from Paris and returned as soon as I had given my testimony.

The CHAIRMAN. You came over on purpose to give your testimony?

General ABBOT. We came over—we were summoned before the committee, and the company wanted me to appear here inasmuch as I understand the English language, and to be present at the hearings.

The CHAIRMAN. Were you summoned in Paris or here?

General ABBOT. I really don't know. I had no summons individually at all. I simply came at the request of the company with its other officers to present the facts.

The CHAIRMAN. Well, that request was made in Paris?

General ABBOT. I really do not know. All I know about it came from the company. I did not receive any request from the committee of Congress.

The CHAIRMAN. You received the request in Paris?

General ABBOT. From the company, certainly.

The CHAIRMAN. And you crossed the ocean so as to attend before the committee of the House of Representatives?

General ABBOT. I was not so informed. I was informed by the company that they would be very glad if I would accompany their delegation to the United States to assist them in presenting their case to the Government, and I came over with that object.

The CHAIRMAN. Were you then a member of the Comité Technique, or were you employed by the company in any other capacity?

General ABBOT. I was a member of the Comité Technique at that time.

The CHAIRMAN. After you went back in March, your labors terminated on that committee, and you were then employed by the company as a consulting engineer?

General ABBOT. Yes; in the latter capacity since about the middle of 1900.

The CHAIRMAN. Did you remain in France or come here?

General ABBOT. I remained in France for three or four months and then I came here.

The CHAIRMAN. What was the particular business on which the company sent you to the United States?

General ABBOT. I do not understand the question.

The CHAIRMAN. What was the particular business on which the company sent you to the United States?

General ABBOT. If you mean in 1899, it was to assist their officers in presenting the case clearly before the Government.

The CHAIRMAN. Have you been engaged in that from that time to this?

General ABBOT. No.

The CHAIRMAN. What other work have you done for the company here?

General ABBOT. I have reduced the notes, the monthly records of the Chagres River, and of the meteorological observations, forwarded from Panama. They are forwarded from Panama to me here, and they come, of course, in the form of undigested material. I study them and deduce from them the daily discharges, etc., of the Chagres River at Alhajuela, Gamboa, and Bohio, etc. I put the information into such form that it can be used for engineering purposes, and forwarded one copy of it to Paris and the other copy I have been forwarding to the Isthmian Canal Commission. That is all my connection with the company here.

The CHAIRMAN. When did you commence that hydrographic work?

General ABBOT. As soon as I got to Paris. When I got to Paris, it was the first thing I did. I had, as I was telling Senator Hanna this morning, before you came in, when I was invited to join this company as a member of the Comité Technique, I had very serious doubts as to the practicability of regulating the Chagres River, and I also entertained fears about the Culebra cut. I had no definite knowledge of this matter, but I told the director-general at that time that I could not consider any proposition of joining the Comité Technique without saying to him frankly that I was biased in the other direction, that I believed the Panama Canal route was very doubtful.

The CHAIRMAN. That is before you ever went to Paris?

Mr. ABBOT. Yes, sir; that was the very first connection I had.

The CHAIRMAN. Now, I do not care about that—

General ABBOT. I would like to finish what I was saying. He then said to me that what the company wanted was, if that was true, to find it out, because they were contemplating the putting of their money into the project, and what he wanted was to have a committee constituted of men competent and willing to give the company the exact truth. I said that under those conditions I would go. As soon as I got to Paris, I took up the subject of the Chagres River. When I began to study the subject, I had a little office in the building of the company and I worked there steadily during the whole time. I went through piles of papers as large as this table.

The CHAIRMAN. I would like to get your statement down without all this unnecessary matter.

General ABBOT. I understood that you asked me about my Chagres River work.

The CHAIRMAN. No; I asked you if you did any other work here besides the hydrographic work in reference to the Chagres River.

General ABBOT. Yes; that I answered.

The CHAIRMAN. You answered that you did not do any other work here.

General ABBOT. No, sir; I did answer that question. I have done no other work since I have been here excepting that work.

The CHAIRMAN. That is what I say. It is all connected with the hydrography of the Chagres River.

General ABBOT. My work as consulting engineer is connected with the climatological and hydrographic observations now going on on the Isthmus.

The CHAIRMAN. Is there anything else that you have done since you have been here?

General ABBOT. No, sir.

The CHAIRMAN. You were to furnish a report to the company in Paris and another report to the Isthmian Canal Commission, you say?

General ABBOT. Duplicate copies of the same report, which I send in the two directions. I have to write my report in French, and I have been sending a manifold copy, printed at the same time on the typewriter, to the Isthmian Canal Commission.

The CHAIRMAN. And you made all of your reports upon predicates or reports of subofficers who sent you their observations on the Chagres River and on the climate?

General ABBOT. Undoubtedly; from the actual observers on the Isthmus.

The CHAIRMAN. You did not go down there yourself?

General ABBOT. Oh, these are hourly observations. I would have to stay there all the time if I did that.

The CHAIRMAN. You did not go down at all, did you?

General ABBOT. I have been there.

The CHAIRMAN. Not since you have been a member of the Comité Technique?

General ABBOT. No; not since I came back to America, after ceasing to be a member of the Comité Technique.

The CHAIRMAN. Not since you were on the Comité Technique?

General ABBOT. No, sir.

The CHAIRMAN. Then you went there and spent how much time?

General ABBOT. I left Paris in February, and reached the Isthmus in March, and left in April—all of the year 1898.

The CHAIRMAN. Was your salary reduced after you were appointed agent to come to the United States to do this hydrographic work?

General ABBOT. Yes.

The CHAIRMAN. How much?

General ABBOT. Senator, I rather protest against such questions, unless you insist upon them. I think it is a private matter between myself and the company. I will say that my salary, at the maximum, did not amount to one-half of what the American Isthmian Canal Commission members received from the Government for similar work. That, I think, shows that I receive nothing more than a fair compensation for my professional services.

The CHAIRMAN. I do not mean that. I mean to ascertain from you, if I can, whether your time was paid for in full, or whether this was merely a side job that you took up, or how.

General ABBOT. If it had involved all of my time I should have considered that the service was worth a good deal more than I received, which is a very moderate sum. It requires hard work, night and day, for about a week to reduce the observations of the month, sometimes more and sometimes less, according to what the river is doing.

The CHAIRMAN. Before that time you say your salary was larger, while you were a member of the Comité Technique.

General ABBOT. It was then less than half of what the members of the Isthmian Canal Commission receive. In other words, the arrangement with me was based on the financial condition of the company. They were not largely provided with money and the sums I received were less than I had received in this country previously for professional work after I had been retired from active service by operation of law.

The CHAIRMAN. What other officers has the company kept in the United States since you have been in its employment?

General ABBOT. I do not think any. Mr. Hutin has been here occasionally, you know, to present the case as the director-general, and afterwards as president, but I have nothing to do with the business matters of the company at all. Mr. Lampre is here at present. Mr. Boyard, of New York, I think represents the company on the board of directors of the Panama Railroad, but I am not quite sure.

The CHAIRMAN. Is he not also the general agent of the company here to transact its business?

General ABBOT. His relations are unknown to me. I really do not know what he does do.

The CHAIRMAN. But he has been constantly in the employment of the company since you have been back from Paris?

General ABBOT. I do not like to answer questions without knowing more about the subject. I have no knowledge whatever of what he is receiving, or how long he is employed for, or what he is doing. I know he is a gentleman that I have often had letters from in matters of interest to the canal, but I am entirely ignorant as to his salary and position; only my impression is that he is the representative of the interests of the company on the board of directors of the Panama Railroad.

The CHAIRMAN. Well, there is Mr. Cromwell and his firm. Have not they been the regular attorneys of the company for sometime?

General ABBOT. I think for a certain time Mr. Cromwell and his firm were the regular legal counsel of the company, and that that connection terminated a short time ago, and has been resumed. I have no knowledge about that, either.

The CHAIRMAN. But your understanding is that it was terminated and then again resumed?

General ABBOT. I can not say that. I do not know that by personal knowledge. That is merely my impression.

The CHAIRMAN. Has he been acting as the counsel for the company all the time since you have been back from Paris?

General ABBOT. That, really, I do not know. As you know, I am simply the consulting engineer of the company, concerned in engineer-

ing matters; I have no knowledge whatever as to the transaction of their business, and I could answer you only upon my imagined ideas and not upon any definite knowledge in this line of questions.

The CHAIRMAN. Mr. Cromwell has also been a director of the railroad?

General ABBOT. I believe he has. I think so.

The CHAIRMAN. Is there any other agent of the company who has been permanently located in New York?

General ABBOT. I think that Mr. Cromwell is one of the board of directors of the Panama Railroad. I do not think he represents the company on that board, though I am not sure about that. I think that is an independent position which he occupies. He was probably elected like any other member.

The CHAIRMAN. He was elected by a majority of the stockholders of the company, and the company, that is, the Panama Canal Company, is a majority stockholder and owns pretty nearly all of the stock of the railroad company.

General ABBOT. My knowledge connected with the whole matter is simply that of engineering. I am familiar with the engineering features, but all of the other matters I have no knowledge whatever of.

The CHAIRMAN. The Isthmian Canal Commission that you speak of was not organized until after March 3, 1899?

General ABBOT. I do not bear that date in mind. I suppose that is a matter of record. That Commission was organized very shortly after the time that I appeared before the committee of the House with the engineers of the company in order to present the case of the Panama Canal Company to the Government.

The CHAIRMAN. Have you made many visits to Washington on this business connected with the company?

General ABBOT. No; I have not made any. I am here now privately visiting my son. Oh, I will change that. I was asked by Mr. Hutin to come on here to see him about certain matters last November and I spent a few days here at that time.

The CHAIRMAN. Well, you have been consulted by Monsieur Hutin and the company, or through him and others, principally in regard to all of the matters connected with this company, have you not?

General ABBOT. No, sir; my business in connection with the company has been limited to the matters of engineering. I have no legal knowledge—I have no knowledge whatever of the financial arrangements of the company. So far as the engineering questions are involved, I have been consulted, as in the line of my duty, as consulting engineer.

The CHAIRMAN. Well, at the time you appeared here as a witness Mr. Choron also appeared?

General ABBOT. Yes.

The CHAIRMAN. He was then the chief engineer of the company, was he not?

General ABBOT. He is now.

The CHAIRMAN. And Mr. Cromwell appeared?

Mr. ABBOT. Mr. Cromwell was the leading counsel of the company.

The CHAIRMAN. And Mr. Curtis appeared?

General ABBOT. Mr. Curtis is a partner of Mr. Cromwell.

The CHAIRMAN. Those were all the witnesses that were brought before that committee of which Mr. Hepburn was the chairman?

General ABBOT. I gave my testimony, if I recollect rightly, on that matter.

The CHAIRMAN. What particular reason was there for that assemblage of witnesses here just at that time?

General ABBOT. The reason was simply this, as I understand it: The Panama Company had no intention whatever of completing its canal otherwise than by the usual method of raising the funds up to the time of the Spanish-American war. They were thoroughly familiar with the problem in Nicaragua; they knew that no private company could possibly compete with the Panama Company and they made no attempt to make known what they were doing on the Isthmus. They were working as a private company in their line of business, because they had no fear of any private company operating in Nicaragua.

But as soon as the *Oregon* went around the Horn and this great enthusiasm arose in America for an isthmian canal, a new possibility was presented to the company—the possibility of the United States Government building a parallel canal, which would have a bad effect on their interests in two respects; first, by rendering it more difficult to raise funds from private sources, with a probability of having to compete with a great government running a parallel line; and, secondly, because the company would need some 15,000 or 20,000 of those West Indian negroes to complete the work. The American company would demand a like number of laborers and there would consequently be a competition which would raise the price of labor and also increase the cost of the construction of the canal.

For those reasons the company decided that it was important to inform this Government officially as to what they had done and what they were doing, so that the changed conditions at Panama should be understood here, and that our Government should understand how much better a canal could be made via Panama than via Nicaragua. This knowledge, perhaps, might induce our Government to reconsider the route, and perhaps to take stock, or in some other manner assist the company in its great enterprise, and thus assure the construction of the best possible canal, and not the canal through Nicaragua. To accomplish this object it was necessary to present the facts fully before the Government, and that was the object of the company when Mr. Hutin came here and presented a copy of the report of the Comité Technique to the President within a month after it was signed. From that time on the company has desired that the United States Government should know what it is doing, and should appreciate its claims, that Panama offers the best possible route for the isthmian canal.

The CHAIRMAN. Now, you got here and you testified on the 17th of January, 1899?

General ABBOT. Yes; about that date. I do not have the exact date in mind.

The CHAIRMAN. You left Paris some time before that?

General ABBOT. I left Paris just before that and came directly here.

The CHAIRMAN. You came in company with Mr. Choron?

General ABBOT. Yes.

The CHAIRMAN. And who else?

General ABBOT. M. Hutin. I think those were the only officers of the company.

The CHAIRMAN. You came here on purpose to make a statement before the committee in the House of Representatives?

General ABBOT. M. Hutin asked me to come here with them, as neither of them speak English and they thought that I could understand the technical questions better than they could, perhaps; and they there-

fore wished me to come with them and assist them in presenting the case to the United States Government.

The CHAIRMAN. On the 21st day of January, 1899, a bill had passed the Senate of the United States for the purpose of aiding this Maritime Canal Company by a vote of 48 to 6.

General ABBOT. I had forgotten that fact. In fact, I do not know that I ever knew it. I had nothing to do with those matters.

The CHAIRMAN. But your company knew about it?

General ABBOT. I do not know. Perhaps they knew it.

The CHAIRMAN. And thereupon your delegation set out to come to the United States?

General ABBOT. Not at all in connection with that, sir.

The CHAIRMAN. Why do you say so when you do not know?

General ABBOT. Because I know very well that it was the passage of the *Oregon* around Cape Horn that first suggested the idea.

The CHAIRMAN. When did the *Oregon* go around Cape Horn?

General ABBOT. In the early days of the Spanish war. I can not give you the exact date. The popular excitement caused by it in connection with an isthmian canal put an entirely new face on the question in the United States. People who had up to that time been lukewarm afterwards became enthusiastic advocates of the canal.

The CHAIRMAN. I understand you to say that practically your mission from Paris in the company of those two gentlemen, coming to Washington, had relation to the passage of the *Oregon* around Cape Horn, and not relation, so far as you know, to the passage of a bill in the United States Senate, by a vote of 6 to 46, to aid the Maritime Canal Company?

General ABBOT. If I knew about that vote at the time I have forgotten it. It had nothing to do with my coming, so far as I was concerned. I simply came to assist these gentlemen in the presentation of technical matters before the Government. It had become very important to the company to have the United States Government know what they were doing, owing to the interest in a canal caused by the passage of the *Oregon* around the Horn.

The CHAIRMAN. Did that company at that time propose to sell this canal to the United States?

General ABBOT. I do not think they wanted to do it.

The CHAIRMAN. Did they try to get a loan from the United States?

General ABBOT. No. As I understood the idea of the company, they wanted the United States to do with them what England did with the Suez Canal. England opposed, as we all know, with the utmost violence the construction of that canal. When they found that they could not stop it, they then, through one of the most brilliant diplomatic strokes that Disraeli ever directed, bought up the reserve stock of the Khedive. Rumor has it that Disraeli paid £5,000,000 for what is now worth £20,000,000 and what has paid large interest ever since. I imagine that the idea of the company was that the United States might be willing to guarantee their bonds on stock security and a controlling vote on the board of directors, the company being reincorporated in America, and that in that way it could raise funds and thus prevent competition with a parallel route. That was my idea. I did not get that understanding officially, but I inferred that.

The CHAIRMAN. In this bill which passed the Senate, as I have shown you here, on the 21st day of January, 1899, being bill 4792, the United

States was provided for in that bill by taking all of the stock in that company, except 6 per cent reserved to Nicaragua and $1\frac{1}{2}$ per cent reserved to Costa Rica; so that the United States in that bill, if that bill had passed through the House, would have been the owner of all the stock of the canal except $7\frac{1}{2}$ per cent. Now, was it not to defeat that bill in the House that you came here?

General ABBOT. Not at all. I did not know of the existence of the bill, so far as I can remember. My idea was that we came because the company did not want to compete with a parallel route, which would double the price probably of labor and make it more difficult to raise funds for completing the Panama Canal. That was my own inference.

The CHAIRMAN. Your object was to defeat legislation in Congress in favor of the Nicaragua Canal Company?

General ABBOT. Not in the slightest degree.

The CHAIRMAN. How could it be otherwise in view of your statement?

General ABBOT. Not at all. I had no object but to fulfill my duty as an engineer of the company.

The CHAIRMAN. You had better correct your statement then.

General ABBOT. Perhaps if you will read the words over I may change them, because I certainly have not intended to make any statement implying that I wished to defeat legislation in Congress. That was no part of my duty, nor so far as I know was it the wish or intention of the company. The company desired to have the United States fully understand, before committing themselves, that there was another route than Nicaragua, which would be cheaper and better for the United States Government to patronize.

The CHAIRMAN. On that examination Mr. Cromwell was sworn as a witness?

General ABBOT. I think so. I do not remember. He appeared as the legal counsel. I do not remember whether he was sworn or not.

The CHAIRMAN. Now I shall read you some of his statements. He brought you down here and examined you, did he not?

General ABBOT. I do not know what you mean. He did not bring me down; I came myself.

The CHAIRMAN. I mean by that that he requested you to come.

General ABBOT. No; I never had any request from him to come. I was asked by Mr. Hutin, the director-general of the company.

The CHAIRMAN. Was Mr. Hutin here then?

General ABBOT. Mr. Hutin was here.

The CHAIRMAN. Present at this examination?

General ABBOT. I so remember it. Possibly I have forgotten. These things occurred some time ago and they have passed out of my mind. I came to America with Mr. Choron and Mr. Hutin; and Mr. Cromwell, as the legal counsel, reported to Mr. Hutin in New York. I think he came on to Washington with us. He had the direction of the legal matters, but he never came between me and Mr. Hutin in the way of exercising any influence over my movements.

The CHAIRMAN. Well, generally, I suppose there is no doubt about it that you came on the invitation of the company to give testimony as a witness before that committee.

General ABBOT. Unquestionably. I said so in the beginning.

The CHAIRMAN. I do not care to ask you who made the precise request. I will read you what Mr. Cromwell said:

"Mr. Chairman and gentlemen of the committee, as two-fifths of

the entire length of the Panama Canal is essentially constructed and in a measure open to navigation——”

Was it in any measure open to navigation at that time?

General ABBOT. I myself navigated it in a boat before that time nearly up to Bohio.

The CHAIRMAN. What kind of a boat?

General ABBOT. We had a little steamboat. When we reached the Mindi River, a little tributary that comes in near Colon, where it had made a deposit, we had to transfer from that little steamboat by a row boat to another little steamboat a few yards farther on, and then we went on——

The CHAIRMAN. Why did you have to make the transfer?

General ABBOT. Because the Mindi River had brought a deposit into the excavated canal sufficient to render it impossible or unsafe to pass over it in the boat we were on.

The CHAIRMAN. Then that statement of Mr. Cromwell was not true, that it was in a measure open to navigation?

General ABBOT. I think it is literally true. We passed from there almost to Bohio on the canal.

The CHAIRMAN. It might be literally true without being true in respect of the navigation of the canal.

General ABBOT. I do not understand that that language means that a large ship could go through.

The CHAIRMAN. You do not understand that?

General ABBOT. No.

The CHAIRMAN. Suppose we did? We would not misunderstand him.

General ABBOT. Really, I am not responsible for his language; but I do not understand that he meant that an ocean steamer could go through two-fifths of the canal. He meant to say that the thing had been excavated. It had been temporarily obstructed at the time that we were there, but a dredge would have taken out the obstruction at that place in three or four hours. The rest of the way our little boat found plenty of water underneath. The Isthmian Canal Commission's information as to the present condition of that excavation of the old company is, I believe, exact and full, and they can give it to you if you wish it—all those matters are, I suppose, on their files.

The CHAIRMAN. I doubt very much if they can.

General ABBOT. Well, they have the data, to the best of my belief.

The CHAIRMAN. They certainly might have gotten that representation from the company; they did not measure it themselves.

General ABBOT. Of course, it should be understood that Mr. Cromwell has no technical knowledge as an engineer, and that he did not attempt to deal with the engineering questions.

The CHAIRMAN. These are not engineering questions; these are questions of fact as to what engineering had accomplished. He then goes on to say, “as the harbors at the termini are natural, open, and free to entry by vessels of the largest drafts;——” Is that true?

General ABBOT. That is true for 30 feet draft. There are few or no general freight steamers to-day that draw more than 30 feet.

The CHAIRMAN. “As there is an existing railroad parallel to the canal and vastly expediting the work of construction; as the concessions, title, and solvency of the company are unquestionable”—Is that true?

General ABBOT. As I have already told you, my knowledge about

the legal affairs of the company is not such as to make me competent to answer that question.

The CHAIRMAN. "As over 3,000 men, with a force of over 150 engineers, have been for four years and are now actually engaged on the canal work"—Is that true?

General ABBOT. I have given you the exact force employed annually.

The CHAIRMAN. During those four years how many millions of cubic yards were taken out by the force of 3,000 men with 150 engineers?

General ABBOT. The work was very extensive, besides the excavation at Culebra, involving exploration, the examination——

The CHAIRMAN. I am speaking of the entire amount of cubic yards of earth taken out during that four years.

General ABBOT. I can not answer that question. I could do it by referring to the annual reports, but I do not carry the numbers in my head.

The CHAIRMAN. You have no recollection on the subject?

General ABBOT. No, sir. I know very well there has been some 5,000,000 or 6,000,000 cubic yards taken out of that canal.

The CHAIRMAN. By the new company?

General ABBOT. By the new company; but exactly the date when they did it—I have the data and the figures, but I can not answer without them.

The CHAIRMAN. "As the United States has by treaty with Colombia entered into special guaranty respecting a canal across the Isthmus of Panama, and as all this work has been done and will be completed without the cost of a penny to the people of the United States, we have a right to assume that the Panama Canal is a necessary if not the controlling factor in the solution of the isthmian-canal problem." That was his first statement.

General ABBOT. The object of the company was to enable the United States Government to form a clear idea of the engineering merits of the canal route. The Isthmian Canal Commission was appointed subsequently, and they have confirmed our statements that it is by far the best route.

The CHAIRMAN. I have not asked you any question to bring out that statement at all. That is a voluntary statement, and I do not want any voluntary statements. I will ask you the questions, and you can put in them any statement that you may wish.

Mr. Cromwell proceeds: "While the receiver had no power to continue construction work, he took especial care to preserve and maintain the work already done, and also secured from Colombia extensions of time to complete the canal, and thereon made large payments to that Government."

Will you state what work was done by the liquidator or the receiver to take especial care of and maintain that work that had been done there?

General ABBOT. Well, sir, I can not speak from personal knowledge, but I can speak from what I believe to be true. When the company failed, they had an enormous amount of plant which was distributed over the canal in different places. The liquidator, I think, prepared storehouses, gathered up the material, and put it in good condition. When I inspected it it was in as good condition as that in any of our ordnance storehouses. The work on the canal had entirely ceased when he took charge, and the care of the property was the principal

thing requiring attention. But from the beginning of his assuming control the liquidator resumed the careful observations on the Chagres River and other physical problems connected with the work. Those observations were continued and have been of immense value ever since. Their work was getting material and continuing the scientific observation.

The CHAIRMAN. What did they do or what have you ever ordered or advised to be done as consulting engineer of that canal in regard to preventing the silt from coming into that canal ditch and filling it up?

General ABBOT. We have not done anything, for the simple reason that we know very well that a dredge will take that stuff out of the canal at 10 or 8 cents a yard. It will be time enough to take it out when we want to use the canal.

The CHAIRMAN. Has any work been done that you can state here now toward the preservation of the canal that had been excavated?

General ABBOT. Nothing has been done. Nature has been left to take care of itself. This silt is the easiest possible material to remove and a pumping dredge will take care of it.

The CHAIRMAN. Well, nature, if it had taken proper care of this canal, would have kept the silt out of it, would it not?

General ABBOT. No, sir; any work which is left incomplete will be subject to deterioration. If that is of a nature which would involve large future expense, it ought to be prevented; but inasmuch as this silt was something that could be taken out as cheaply at one time as at another, and as we had no present use for the channel, there was no reason that the limited funds of the company should be so expended.

The CHAIRMAN. And consequently none of it was spent.

General ABBOT. No, sir; there has been no dredging done.

The CHAIRMAN. Have you ever examined the stretch of the canal between the coast line of the Bay of Panama and Miraflores Lock to see whether that had filled up?

General ABBOT. Yes.

The CHAIRMAN. How is that?

General ABBOT. It has to a certain extent filled up.

The CHAIRMAN. How full?

General ABBOT. I can not give you the feet and inches. We went up in a boat and had a look at it. Considerable silt comes down there. When a canal is first excavated, rock or hard pan may be encountered and considerable difficulty and expense may result. Any subsequent deposit will be fine material easy to remove.

The CHAIRMAN. I would like to get an answer to my question.

General ABBOT. Senator, I answer your questions to the best of my ability. I understood that you wanted the reasons.

The CHAIRMAN. I have not asked you for any reasons at all, but of course in answer to my question if you state any I wish you would state that they are reasons.

General ABBOT. I understood that you wanted my reasons why, as consulting engineer, I did not advise taking out that silt and spending the money.

The CHAIRMAN. The money was in the Treasury?

General ABBOT. Yes.

The CHAIRMAN. And the money is there now?

General ABBOT. Yes.

The CHAIRMAN. Three million dollars of it?

General ABBOT. I do not know the amount.

The CHAIRMAN. Mr. Lampre stated \$3,000,000.

General ABBOT. I do not know; but, in my judgment, it would be a misapplication of the funds of the company to now do unnecessary work which might require to be again rejected and which can be done just as cheaply later on.

The CHAIRMAN. That is, doing it over a second time?

General ABBOT. I do not quite understand.

The CHAIRMAN. After doing it the first time, you say it would be a misapplication of the funds to take it out?

General ABBOT. Yes. To take out this light filling, very different from the original material.

The CHAIRMAN. Well, you think it would have been a misapplication of the funds to have gone on and dredged out that canal?

General ABBOT. I think so; yes, sir.

The CHAIRMAN. Mr. Cromwell says again: "I beg to remind the committee that we are not appealing for any money; of course we are rather independent in regard to our financial statements."

General ABBOT. Rather independent?

The CHAIRMAN. That is what he says.

General ABBOT. Oh, he meant that no application had been made to Congress for funds. The company did not put themselves in that position at all, they only asked to have their work investigated.

The CHAIRMAN. The company had no mortgage or bonded indebtedness of any kind. Its property is free from all incumbrance, it has no floating debts or other indebtedness than monthly pay rolls, promptly met. The company, being financially independent and continuing the construction with its present resources, has neither created a bond issue nor solicited funds from the public nor from any government.

The board of directors, stating their relations to the enterprises as a solemn obligation and trust, resolved, first, to determine the feasibility of the canal from an engineering and financial standpoint; and second, to carry on the work to final consummation under established conditions with the utmost dispatch, efficiency, and economy.

General ABBOT. Yes; that is correct.

The CHAIRMAN. During the past four years this board has addressed itself to the problem of ascertaining the scientific and commercial feasibility of the project with a care, comprehensiveness, and thoroughness that must command your respect and merit your confidence.

General ABBOT. Yes; that is very true.

The CHAIRMAN. Yes; you say that is all very true. Now, being true, what aid or relief did that company expect to get from Congress by your appearing here before this committee and making your statements?

General ABBOT. The United States, knowing that a much better canal was under construction over another line, might open up the question, so that they might consider what they would choose to do in the matter.

The CHAIRMAN. You wanted, if you could, to prevent the opening up of another line?

General ABBOT. Not at all. It was simply to let the United States Government understand that the route which would control the traffic

of the Isthmus was subject to their approval, if they wanted to take an interest in its construction.

The CHAIRMAN. Did you come here and expect to find the Congress of the United States ignorant of this question?

General ABBOT. We did, most emphatically. I was in total ignorance myself until I studied the subject professionally.

The CHAIRMAN. You came to enlighten, then?

General ABBOT. No; I did not.

The CHAIRMAN. I do not mean what you did personally, but the company.

General ABBOT. The company did not come with any idea of enlightening the Congress of the United States on the matter. They came here to prevent the serious injury to their interests which would result from the Government of the United States starting a parallel line at the time when they were about trying to raise funds for the completion of their works, and also to prevent a probable rise in the price of labor by the construction of two canals at the same time.

The CHAIRMAN. Now, I want you to listen to that last answer which you made and see if you have stated what you desire.

The last answer made by General Abbot was repeated to him.

General ABBOT. That is my understanding, but I do not represent the company in expressing it. It is my honest belief.

The CHAIRMAN. What company do you refer to, or what line do you refer to there as a parallel line?

General ABBOT. The Nicaragua line.

The CHAIRMAN. Then you came for the purpose of persuading the Government of the United States not to build the Nicaragua Canal?

General ABBOT. We came to let the United States Government see what their true interest was—full knowledge of the facts would be the best thing for the United States as well as for the company.

The CHAIRMAN. Are you not here now for that same purpose?

General ABBOT. I am here to-day because I was summoned by you.

The CHAIRMAN. No; I did not. Mr. Hanna summoned you.

General ABBOT. Well, Senator Hanna. I am here under orders.

The CHAIRMAN. Are you not brought here for the purpose of doing that same thing, that is, preventing the Government of the United States from selecting the route parallel to the Panama route?

General ABBOT. That is a question for Senator Hanna to answer.

The CHAIRMAN. Is not the Panama Canal Company to-day endeavoring to get the United States to accept its route and pay for it in preference to the Nicaragua route?

General ABBOT. I do not think that any member of the company would object to the United States building a canal if they want to in Nicaragua, but they would be glad to have the United States buy their route, especially if they are going to build one through Nicaragua. In other words, I do not think that the intention of the company has been in any way to prevent the United States Government building a canal in Nicaragua if they want to. They did want to have it known that a much better canal was available, so that the Government could use its own discretion as to building one or both of them.

The CHAIRMAN. Well, are you here to-day or is the company here, in making the offer to sell out all of its property for \$40,000,000 to the United States, only for the purpose of convincing the Government of the United States that it is better to build a canal through Panama than through Nicaragua?

General ABBOT. That is a matter of which I have no knowledge whatever.

The CHAIRMAN. Is it not the purpose of the company to get the Government to take for \$40,000,000 the property that it knows it can not complete?

General ABBOT. No, sir; not by any manner of means.

The CHAIRMAN. Can they complete it?

General ABBOT. I believe most fully that if the United States Government loses that canal, that it will be built and completed independently of the United States Government.

The CHAIRMAN. What would it cost to complete it?

General ABBOT. One hundred million dollars.

The CHAIRMAN. Who will probably contribute that money?

General ABBOT. That would be all speculation for me to answer, but England has already secured the control at Suez, and might play the same game with us on the Isthmus that she did with France in the Suez Canal.

The CHAIRMAN. You mean that England might buy out this canal for \$40,000,000 and complete it?

General ABBOT. No, sir; all that would be necessary for England to do would be to buy controlling interest in the stock of the company. That does not controvert the principles of the Monroe doctrine at all. The control that England has over the Suez Canal to-day is just as absolute as if she had built it with her own money.

The CHAIRMAN. By buying out the stock of the old company you mean that England could get the control of this canal by paying \$40,000,000 to the present company, the same sum that you offer it to us for?

General ABBOT. The proposition, as I understand it—this is beyond my personal knowledge, but, of course, I have ideas—the proposition which the company desired on its own part was not at all to sell the canal to the United States. That arose from the demand of the United States to own and control the canal entirely, independent of any company.

The CHAIRMAN. Do you say this proposition of the canal company was not made by the company, but was invited by the United States?

General ABBOT. No, sir; I said nothing of the kind, and I do not imply that idea. I said that the wish of the Panama company, so far as I could infer it, was not at all to sell outright and give the whole “control, management, and ownership” to the United States. Their proposition, as I remember it, was to reincorporate as an American company, to give the controlling interest in the stock to the United States just as England secured it at Suez, to give them the control of the board of directors, and in that way to become a private company of which the United States should have the full control.

The CHAIRMAN. Then you refer now to the charter that was obtained by Mr. Cromwell in New Jersey.

General ABBOT. No; he may have done that, but I know nothing of it.

The CHAIRMAN. You have just spoken of a company to be organized here. What company do you refer to?

General ABBOT. The proposition made again and again to the Isthmian Canal Commission—you will find it in the report reiterated within a few months—was to try and get the United States Government to enter into an arrangement of that kind.

The CHAIRMAN. Well, was a company to be organized here in one of the States?

General ABBOT. A company was to be formed and organized; but this company that was gotten up in New Jersey never, so far as I know, had any negotiations with the New Panama Canal Company.

The CHAIRMAN. But Mr. Lampre swears that was the object of getting up that corporation—to carry on the very view that you are expressing.

General ABBOT. He probably knows, and I do not. It is outside of my province.

The CHAIRMAN. You do not then know in what State or under what conditions the American Canal Company was to be organized, into which the United States Government was to be invited to take stock?

General ABBOT. So far as any definite action was taken, I believe what I have already stated was the proposition of the company. What was done in reference to the New Jersey company I do not know. I have never even known the name of the president or of any member of the board of directors.

The CHAIRMAN. Well, nobody else does, because none were elected.

General ABBOT. I only refer to the proposition, which you will find stated in the final report of the Isthmian Canal Commission, the reiterated proposition of Mr. Hutin, that instead of buying the canal the United States should guarantee the bonds, etc., and let the company go ahead and finish the work.

The CHAIRMAN. Was that the object that the company had at the time that you came over here?

General ABBOT. Yes; as far as I understand the subject. I have never had anything to do with the negotiations, and give you only inferences.

The CHAIRMAN. To get the United States interested in the Panama Canal by organizing a company in one of the States, in which the Government would take stock and have control of the board of directors.

General ABBOT. Some such proposition was submitted. I can not say what views the company had, because, as I have stated, I had nothing to do with the matter and was not consulted on any of those questions. I only infer that that was the general idea. I know, however, that a definite proposition was made to the Isthmian Canal Commission, and was rejected by it because it was not within the terms of the law under which they were acting, which required that the ownership and control of this canal should be vested in the United States.

The CHAIRMAN. So that when you came here before that committee you understood at that time that such a proposition as that was made to the United States Government?

General ABBOT. No; I do not think I did at that time. I think the proposition was made at a later time than that. The principal idea, as far as I know, which brought us over was to give to the United States Government a clear and definite idea of the conditions in Panama.

The CHAIRMAN. Did not this proposition come along with it?

General ABBOT. If it did, I do not know it. I think that the company never expected to have a proposition of that kind considered until the United States had authorized it to appear before some board or technical body and to fully explain the details of its plan.

The CHAIRMAN. Now, you have stated that in your belief this canal

will be completed, even if the United States makes a canal over in Nicaragua?

General ABBOT. I think it will be completed. Whether immediately or not is another matter. I think that in the great commercial struggle which is approaching the existence of a route which will control the traffic when opened to navigation will certainly enable Colombia and the company to arrange for the completion of a canal now nearly half excavated, without infringing in any manner upon the Monroe doctrine. Whoever buys the stock, the company will remain a purely private company, completing a work that has been in progress twenty years.

The CHAIRMAN. You stated that Great Britain or the English people could buy up the stock.

General ABBOT. I suggested they could do just exactly as was done at Suez.

The CHAIRMAN. Then you further stated that it could be done for \$100,000,000?

General ABBOT. I say the completion of the canal could be effected for \$100,000,000.

The CHAIRMAN. And if this stock did not cost more than \$40,000,000, then it could be done for \$140,000,000?

General ABBOT. No foreign government would buy the canal, and nothing more would be heard of the \$40,000,000 offer. If the company could raise \$100,000,000, the canal would be completed. All that is needed is credit to raise that sum, and in my judgment any government which should furnish that credit would make a good investment.

The CHAIRMAN. Now, has this subject been under discussion between you and other gentlemen representing this company at all?

General ABBOT. No, sir.

The CHAIRMAN. These are just your private views?

General ABBOT. Purely my private views.

The CHAIRMAN. So you think the outcome of it, if we do not buy the Panama Canal, is that there will be two canals?

General ABBOT. I believe, knowing as well as I do as an engineer the enormous advantages of this canal, I do not believe that it will be left for an indefinite period unoccupied.

The CHAIRMAN. If that is so, why is this company anxious to sell its property for \$40,000,000, which you appraise as being worth above \$100,000,000?

General ABBOT. That action at the general stockholders' meeting was a great surprise to me, as it was to everyone, I think. It was the action of a popular body, which sometimes is very hasty.

The CHAIRMAN. Have they recalled it, or do they intend to recall it?

General ABBOT. Not that I know of. I might as well infer what the action of Congress will be.

The CHAIRMAN. Is not the company and its officers, and you included, here to-day pressing this matter before Congress?

General ABBOT. The proposition, as I understand the matter, is simply this, that the stockholders concluded to waive what they considered the fair value of their property, and to sacrifice it for \$40,000,000. That, I understand, was the action of the body.

The CHAIRMAN. Well, you think it was a panic among the stockholders?

General ABBOT. I can only imagine that it was a panic. I was not there—I have no knowledge—but I believe it to have been a panic because there is no question that the property is worth more than that.

The CHAIRMAN. You do not know whether they have got over their fright or not?

General ABBOT. I have no knowledge; I have not been to Paris now for over a year. I do not even know what was the cause of the action. It is a fact, however, they took that action, and it was so much opposed to the judgment of the president that he resigned immediately in consequence of that action.

The CHAIRMAN. At the same time they state here they have got the agreement of the court that it shall be ratified for \$40,000,000.

General ABBOT. That legal matter I know nothing at all about. I have no doubt about the legality of the transfer—but at the same time I have no knowledge on the subject.

The CHAIRMAN. And they state further that they have authority from the court to make the sale in advance of any price being fixed.

General ABBOT. All those facts are entirely beyond my knowledge.

The CHAIRMAN. You have no knowledge of them at all?

General ABBOT. I have no knowledge direct or indirect.

The CHAIRMAN. Well, you read these papers, you stated; you have read all the depositions taken here.

General ABBOT. Yes; those that I have seen.

The CHAIRMAN. Didn't you find that in the depositions of Mr. Pasco and Mr. Lampre?

General ABBOT. I read Mr. Lampre's depositions. I have not received a copy of Senator Pasco's, but, as I say, I am here to give facts; I am under oath. I believe a legal transfer can be made, but I do not know the details.

The CHAIRMAN. Have you ever examined your testimony, since you gave it, before this committee of which Mr. Hepburn was the chairman?

General ABBOT. I do not think I have read it over since that time.

The CHAIRMAN. It is all here, and I will furnish you with a copy of it, and I will ask you before you complete your deposition to look through these statements here and see if you have any corrections to make in them.

General ABBOT. Very well, sir; I will do so.

The CHAIRMAN. You do not know the three propositions that were made for the disposal of the canal to the United States, through Mr. Hutin and Mr. Cromwell, before this last proposition to sell for \$40,000,000?

General ABBOT. I know what statements were made in the correspondence published by the Isthmian Canal Commission. I know the proposition of Mr. Hutin to the Government was to the effect that he perfectly recognized that no commission could pledge the United States, inasmuch as that depends on the action of Congress. But he offered to pledge the company to a maximum price and to fix that maximum price on which the property would be transferred, first, by appraising the different classes of property; then by discussing these values amicably with the Commission in the spirit of making liberal concessions as to the different items; in case no agreement could thus be reached, then to refer such matters to arbitration in the usual way, and finally, that the company should be bound by the award of

the arbitrators. The total maximum price for which the property would be sold could thus be found by adding up these several sums.

The CHAIRMAN. You are referring to the proposition that Mr. Hutin submitted in his letters to Admiral Walker?

General ABBOT. Yes.

The CHAIRMAN. You do not know of any outside of that?

General ABBOT. No, sir.

The CHAIRMAN. Was this channel in the Bay of Panama opened by the new company or by the old company?

General ABBOT. Opened by the old company. The new company has done some dredging, especially around La Boca, and they have made a new wharf for the Panama Railroad, something like a thousand feet long, with a foundation on piles sunk by the pneumatic process. It is a fine, large wharf.

The CHAIRMAN. It cost over \$1,000,000, did it not?

General ABBOT. Yes; I think it did. I know it did. The object was this: The steamers in Panama Bay, in order to reach the railroad, have always had to lighter from the anchorage off the island of Naos. The new arrangement is to utilize the part of the canal completed in that section, and thus to enable the shipping to go alongside the pier and unload right into the cars.

The CHAIRMAN. Was the railroad at the Culebra cut removed by the old or the new company?

General ABBOT. I can show you precisely on the map in two different colors what the old company did and what the new company has done.

The CHAIRMAN. The map will not mean anything in the testimony because we have no copy of it. Can you state whether that work had been partially done by the old company and was completed by the new? I do not care anything about how much of it.

General ABBOT. The excavation of the Culebra cut?

The CHAIRMAN. I mean the work of removing that railroad from the Culebra excavation and putting it on the hill.

General ABBOT. That is the first I have heard of the railroad.

The CHAIRMAN. Don't you know that it has been removed from the Culebra cut—

General ABBOT. It never has been in it.

The CHAIRMAN. It was so near it that they had to remove it?

General ABBOT. It crossed the canal near the cut; yes, sir.

The CHAIRMAN. They did remove it?

General ABBOT. And then constructed a new line for the railroad in order to prevent a crossing right at the opening of their cut.

The CHAIRMAN. That is exactly what I am referring to. Was that done by the old company or the new company?

General ABBOT. Oh, the old company had nothing to do with it. It was done within the last year and a half or two years. The old company did make a survey with that object in view—I am not sure exactly how far it was carried—but the work has all been done by the new company, and very recently; one of the last things they have been doing.

The CHAIRMAN. Was it ever the expectation of the new company, the one now in organization, to complete the canal with 60,000,000 francs?

General ABBOT. No, sir; they never had any idea of doing it.

The CHAIRMAN. That was all of their capital stock; that was all that was paid in.

General ABBOT. The object of that new company was twofold; first, to develop the possibility of completion; and second, to undertake the work if it was found to be feasible. They expected to spend their money for the first object and intended to go to the great moneyed men of the world to get funds if they found it possible to go ahead and complete it.

The CHAIRMAN. Then, the work of the new company was entirely experimental—to see whether or not the canal could be built as a lock canal through that Culebra Pass?

General ABBOT. The work that it was proposed to do with that 65,000,000 of francs——

The CHAIRMAN. There is only 60,000,000, because 5,000,000 belong to Colombia.

General ABBOT. The sum raised was 65,000,000 francs, if I remember rightly. The object was in accordance with the recommendations of what is known as the Comité d'Etudes, instituted by the liquidator soon after he received the property from the courts, in order to enable him to know what was best to do with this property. There was a large amount of it, and he instituted what was known as the Comité d'Etudes, which made a report in 1890 after visiting the Isthmus and carefully studying the subject. They reported that under existing conditions a sea-level canal was not to be thought of, but that they believed a perfectly practicable and useful lock canal could be made; and they submitted a project based on the best information existing at the time.

They did not consider that information to be based upon as thorough examination as was necessary, and recommended that, before any large expenditure of funds was inaugurated, the plans should be verified on the ground by a thorough investigation and survey. The liquidator accepted this advice; and, in accordance with it, he organized this new company, with a capital of 65,000,000 francs, with a view to carrying out those ideas—investigating the problem and finding out exactly what is the best project. The new company have worked on these lines, being at the same time careful not to waste the funds, but to make all experimental excavation contribute to the ultimate completion of the canal. Thus the cut at the Culebra has been made deep and not over a broad surface, with a view to develop future conditions when the work is resumed on a large scale.

The work of the new company has been restricted to excavations in the most difficult part of the route and to the surveys, measurements, and investigations necessary to determine the best plan to regulate the Chagres River. This change of route of the railroad was simply to remove an obstruction at the cut, and the building of the pier at La Boca was executed by the company at the expense of the Panama Railroad in order to enable it to take advantage of the canal so far as already constructed in the bay of Panama in the transshipment of freight.

The CHAIRMAN. Now I will ask the reporter to read the question which I asked you.

The question as put by the chairman was read.

The CHAIRMAN. Now, you have gone through a long explanation in answering that question. I will be obliged to you if you will answer it directly. Was it an experiment or was it not?

General ABBOT. I should not call it an experiment.

The CHAIRMAN. But you have defined it as an experiment, no matter what you call it.

General ABBOT. I define it as an investigation to determine what ought to be done.

The CHAIRMAN. Is not an investigation an experiment?

General ABBOT. No, sir.

The CHAIRMAN. Did they have any money besides the 60,000,000 of francs with which to build that canal?

General ABBOT. They had nothing at that time excepting the 65,000,000 of francs.

The CHAIRMAN. They did not have 65,000,000; they had 60,000,000.

General ABBOT. If you include what they paid to Colombia.

The CHAIRMAN. They did not pay Colombia a cent, except to take stock.

General ABBOT. Well, whatever that sum is; it is a matter of record.

The CHAIRMAN. They had 60,000,000 of francs. Now, could they complete that canal with that money?

General ABBOT. No, sir.

The CHAIRMAN. Was it possible?

General ABBOT. No, sir.

The CHAIRMAN. They therefore must have expected, when they developed through these investigations, as you call it, that the canal was possible of construction at a reasonable cost, that they would appeal to somebody else for money?

General ABBOT. Certainly.

The CHAIRMAN. They did not expect to pull it out of their own pockets—the directors—to build that?

General ABBOT. No, sir.

The CHAIRMAN. To whom did they expect to appeal?

General ABBOT. They expected to have a definite plan of a canal prepared with every care, and that is the reason why they had the Comité Technique to act upon it, and then go to the great moneyed people of the world and show them that it would be a good investment for their money.

The CHAIRMAN. Have they gone to the great moneyed people of the world?

General ABBOT. I believe it would have been done long ago if it had not been for the passage of the *Oregon* around the Horn.

The CHAIRMAN. You think that stopped the whole proceeding?

General ABBOT. I think it has largely retarded the work—the sudden idea that if the United States should undertake to build a parallel canal, it would render the raising of funds and procuring of labor more difficult.

The CHAIRMAN. Did they go to the world with any application to take stock in the company after your Comité Technique had decided that the canal was practical and feasible over that route?

General ABBOT. No, they made no proposition to my knowledge.

The CHAIRMAN. And never have from that day to this?

General ABBOT. No, sir; not to my knowledge.

The CHAIRMAN. It has been a long time since the *Oregon* went around the Horn, and the United States Government has not yet resolved to build a canal.

General ABBOT. As I say, the company was interrupted in its contemplated progress by this sudden change in the aspect of the ques-

tion. They are waiting now the action of our Government. Having opened negotiations here with respect to the property, they could not properly go ahead with a different plan to raise funds. The company is now waiting for the decision of the Government in order to know what further to do. What they will do I have no more idea than you have.

The CHAIRMAN. There has been no other *Oregon* that has gone around the Horn to cause them to drop this proposition from \$109,000,000 to \$40,000,000 for the property?

General ABBOT. No, sir.

The CHAIRMAN. What caused that sudden drop in price?

General ABBOT. I have as much curiosity to know as you have, but I have no more idea than you have.

The CHAIRMAN. But there is no event connected with the canal that you know of that has made it necessary that they should drop from \$109,000,000 to \$40,000,000?

General ABBOT. I am utterly unable to explain that act.

The CHAIRMAN. Why do you prefer the Morison clay dam to the rock dam at Bohio?

General ABBOT. Because I regard it as a cheaper and better dam.

The CHAIRMAN. Why do you prefer the dam that is proposed by the Comité Technique to either the Morison or the rock dam?

General ABBOT. By our Commission, do you mean?

The CHAIRMAN. Yes; your Comité Technique.

General ABBOT. I consider that that dam meets all the requirements of the case. It is a more economical dam than either the Morison or the commission dam.

The CHAIRMAN. Well, the dam as you project it and advise the company to adopt it, required three levels of the canal.

General ABBOT. Not at all, sir; it is equally applicable for two or three. The level of Lake Bohio is unchanged, whether we have a set of locks above it or not; that portion is unchanged.

The CHAIRMAN. And you made provisions sufficient, you thought, for constructing a canal through the Culebra cut and the Imperador cut.

General ABBOT. You mean to carry the center level through?

The CHAIRMAN. Yes.

General ABBOT. We made provisions at Bohio for constructing a dam which we believed ample to maintain that level through the Culebra cut.

The CHAIRMAN. How did you intend to supply that with water from the Chagres—by letting the water right into the lake?

General ABBOT. Yes.

The CHAIRMAN. Without any regulation?

General ABBOT. No; we put in a dam at Alhajuela, above, which enables us to break the force of the flood and to supply all the water we need in the dry season.

The CHAIRMAN. Do you consider that dam as being necessary?

General ABBOT. I do not consider it as absolutely essential, as I have said already in referring to the plan of the Isthmian Canal Commission, but I regard it, with the other modifications suggested, as a great improvement and I think it ought to be built. We can build the two dams at Alhajuela and Bohio for less money than the one projected by the Isthmian Canal Commission at Bohio will cost.

The CHAIRMAN. Have you consulted with any of your conferees in that board to see whether they have compared the recommendations of that Comité with the Comité d'Études?

General ABBOT. The Comité d'Études? oh, yes; we had that paper before us, of course, and we studied their project and we modified it materially, because, just as the Comité d'Études had feared, we found some of their information based on the imperfect surveys of the old company to be defective. They had a dam at San Pablo, and we found that we could not build one there. We did not adopt their plan.

The CHAIRMAN. Where is this San Pablo?

General ABBOT. It is a short distance above Bohio. They proposed to have a dam at Bohio and at San Pablo above.

The CHAIRMAN. Is it a mile?

General ABBOT. Oh, more than that. I can show you exactly on the map. It is about 6 miles.

The CHAIRMAN. What was the object of the dam at San Pablo?

General ABBOT. Their plan consisted in making two dams—one forming a reservoir up here [indicating] and the other one forming a second level below. There were to be locks at San Pablo and at Bohio.

The CHAIRMAN. You speak of the Isthmian Canal Commission?

General ABBOT. No, sir; of this Comité d'Études plan in their report of 1890.

The CHAIRMAN. And the Comité Technique put the dam at Bohio and struck out the dam at San Pablo?

General ABBOT. Yes; modified that plan radically.

The CHAIRMAN. And put in a dam at Alhajuela?

General ABBOT. Put in a dam at Alhajuela. The Comité d'Études did not have that dam; we put it in.

The CHAIRMAN. And now you say that that dam at Alhajuela is in your opinion necessary for the work?

General ABBOT. No; I do not say that it is necessary. I said I judged the best plan would include it. As I have already said, the plan of the Isthmian Canal Commission does not include it—at least at first.

The CHAIRMAN. What do you mean by the best plan?

General ABBOT. I mean to say the most advantageous and most economical plan includes a dam at Alhajuela.

The CHAIRMAN. For what purpose; to control the floods or supply the water in case of drought?

General ABBOT. Both.

The CHAIRMAN. Is it necessary to have a dam at Alhajuela to supply water in time of droughts in dry season?

General ABBOT. No, sir; the source of supply on which the Isthmian Canal Commission depends is Lake Bohio. They allow this large lake to fall 3 feet under the influence of evaporation and leakage and lockage during the dry season. They estimate that will give them the needed supply for operating the canal in low-water season. It is open to the uncertainty of possible seepage, which may perhaps pass out through those strata below the dam; and I prefer to hold my low-water supply at Alhajuela, where I know it will be when I want it.

The CHAIRMAN. In consequence of the dry season as a great factor in the question of evaporation, it would be necessary to have a supply of water that was not furnished by the current flow of the river.

General ABBOT. Yes, we all recognize that.

The CHAIRMAN. That water must be supplied in any plan that would be practicable?

General ABBOT. Yes; everybody agrees to that.

The CHAIRMAN. Suppose the lockage of that canal should amount to, say, thirty ships a day, would not that make it necessary to have the water supply in the dry season to supply that lake?

General ABBOT. We estimate that with twenty ships a day we can take care of a travel of, say, 23,000,000 tons, and we have not looked beyond that point.

The CHAIRMAN. Isn't it wise to look forward to it?

General ABBOT. Well, we could make another canal in case one proves insufficient. The largest tonnage that the Suez has ever passed is about 10,000,000, and with the provisions that we have made we can pass 23,000,000. That is so far above any probability within the next hundred years that we thought we would let our descendants settle the problem after that.

The CHAIRMAN. We are not building this canal for a hundred years.

General ABBOT. No. Each age will provide for its own needs.

The CHAIRMAN. It already appears that the merchants, tradesmen, shippers, etc., in Europe, Asia, and Africa around the Mediterranean Sea have been proposing to duplicate by a fresh-water canal from the Nile to Suez, the Red Sea, or in that vicinity, because either the rate of tolls is too high on the Suez Canal or because it is insufficient for the condition of trade.

General ABBOT. I have no knowledge about that.

The CHAIRMAN. That is going on.

General ABBOT. Every age must provide for its own necessities.

The CHAIRMAN. But this age is now trying to provide for a duplicate of the Suez Canal—a fresh-water canal from the Nile to the Red Sea.

General ABBOT. It may possibly come that the pressure of business will become so great that we can not accommodate it at Panama, and then we will have to build another canal at Nicaragua.

The CHAIRMAN. But the trade has already become so great at Suez that this movement is on foot.

General ABBOT. Well, I had not heard of that. If the traffic exceeds 23,000,000 tons at Panama, we certainly would begin to think about making a new canal.

The CHAIRMAN. Is that canal opening, or the opening at Culebra cut, wide enough without being made wider for the canal proposed by the Isthmian Canal Commission?

General ABBOT. We made it 120 feet and they make it 150 feet wide, so that they plan to make it 30 feet wider than we do.

The CHAIRMAN. You are speaking of the canal prism?

General ABBOT. I am speaking of the prism itself, proper.

The CHAIRMAN. I am speaking about the land that lies above that prism.

General ABBOT. If you add 30 feet more at the bottom, you have to carry it up on the slope to the top.

The CHAIRMAN. You have to take 30 feet off that entire cut on both sides?

General ABBOT. No, sir; on one side; or if you take 15 feet off on each side you would increase it on both sides.

The CHAIRMAN. That would be the proper way to do it, would it not?

General ABBOT. That depends on the locality. The crest of the ridge is not horizontal. We would plan the work to save excavation as much as possible.

The CHAIRMAN. So that the enlargement of this canal to 150 feet would require that you should take off 30 feet from the entire face of the slope through Culebra and Imperador?

General ABBOT. Yes; it would involve much more excavation. Neither the company engineers nor the Isthmian Canal Commission would favor increasing the slope; if they wanted to have the canal wider at the bottom they would take it off the sides.

The CHAIRMAN. What provision did you make, as consulting engineer, for getting rid of the sliding land at the top of the cut or in the vicinity of the cut?

General ABBOT. It is giving no trouble at present; we have not had any for a long time. Of course, when the final cut is completed a system of drainage will be adopted to thoroughly take the water off, and then there will be no further trouble.

The CHAIRMAN. Did your committee make any provision for that arrangement?

General ABBOT. We included that item, which would be a trifle, in our percentage of contingencies.

The CHAIRMAN. The work has been going on on that canal all the time since you have been connected with it?

General ABBOT. Yes.

The CHAIRMAN. Has any drainage been put in there?

General ABBOT. There has been drainage wherever it was necessary. There has been no drainage put in above where the old company excavated, as there was no necessity for it; but wherever there has been any new excavation there has been proper draining. The old company neglected that.

The CHAIRMAN. That drainage would have to be reestablished in the event that you took off the front of the slope.

General ABBOT. The drainage that we have been making is draining the cut. We are working inside of the cut.

The CHAIRMAN. The drainage you have been making is in the cut?

General ABBOT. Yes; in the excavation.

The CHAIRMAN. Down at the bottom?

General ABBOT. Down where we were digging.

The CHAIRMAN. I am speaking about the drainage——

General ABBOT. That portion above? The cut at present does not occupy the final position on either side. A matter of a few thousand dollars, even less than that, would attend to all the water above, and keep it off entirely from the slope, the actual cutting. The slopes we cut in steppes for that very purpose, so that we can have a drain on each steppe.

The CHAIRMAN. What I am trying to get at is whether or not in the work of construction you carried on there, have you provided drains to control the flow of water at or about the upper stratum that you cut through in going down from the top of the Culebra hill?

General ABBOT. Those are included in our estimates; we had not reached the point of constructing them.

The CHAIRMAN. I wanted to know whether any had been made.

General ABBOT. There would be no reason for it.

The CHAIRMAN. Would it not answer your purpose just as well to say that none had been constructed?

General ABBOT. We had not reached a point when that work was necessary.

The CHAIRMAN. Have there been any landslides within your knowledge?

General ABBOT. No, sir.

The CHAIRMAN. Since or before you went there to examine it?

General ABBOT. Not since the days of the old company, as far as I know.

The CHAIRMAN. The days of the old company and the days of the new company are very close together.

General ABBOT. No, sir; one ended work in 1889 and the other began work in 1895.

The CHAIRMAN. There were no landslides while the liquidator was taking care of that property?

General ABBOT. I was not there during that time; I have no knowledge what occurred.

The CHAIRMAN. Have you ever heard of landslides there?

General ABBOT. The old company had a great many of them. When they were cutting through this surface soil, this disintegrated material, they had a great deal of trouble with slides. It was perhaps partly due to their not taking proper care to protect them by drainage, but they had a great deal of trouble. Since the new company have been at work different conditions are encountered. The old company had dug through that bad soil, and the new company are working in this indurated clay schist, which gives no trouble.

The CHAIRMAN. I am trying to get at what was the condition of this earth there as to its stratification, where the old company did its work.

General ABBOT. There have been, as far as I know, no slides or trouble there. We have not had anything to do above the level where they were digging. You know they dug across the whole extent of the cut at top. We have been digging here [indicating] on one side, so that what happens here is a matter of no importance. We have had no trouble.

The CHAIRMAN. Have you ever known or heard of the railroad track being covered up by landslides there?

General ABBOT. A great many times, sir.

The CHAIRMAN. Sometimes three deep, so that you could not get the tracks out?

General ABBOT. Yes, sir.

The CHAIRMAN. That is true, is it not?

General ABBOT. Yes, sir.

The CHAIRMAN. Where was that?

General ABBOT. I thought you asked me a general question. Do you mean on the Panama line?

The CHAIRMAN. Yes.

General ABBOT. I did not understand you.

The CHAIRMAN. I mean in this place.

General ABBOT. These slides all occurred in the days of the old company, and I have no knowledge of them except in the writings. I never have seen any of that work; I had nothing to do with it.

The CHAIRMAN. What did the writings say about it?

General ABBOT. It appears that they made a great deal of trouble. When the contractors began, they ran their cars on the side hill and dumped on the down side, shifting tracks as the pile widened. When the rains came water got underneath and carried the thing down, and they had a great deal of trouble. They then put out trestle bridges at right angles to the side hill and run the cars out on them and dumped on both sides of the trestle. In that way they avoided this sliding and remedied the difficulty. That was one of the devices that the old company used in later years in working at the Culebra dumps.

The CHAIRMAN. In there still any part of it in the Culebra or the Imperador cut from top to bottom that is liable to slide?

General ABBOT. The top portion would be liable to slide unless it was prevented. With the lower portions there is no danger.

The CHAIRMAN. But it is liable to slide. Why is it liable?

General ABBOT. It isn't liable to slide, in my judgment as an engineer. The material is a hard clay schist, which requires blasting to get it out, and it will stand almost vertical.

The CHAIRMAN. Is that true up to the top of the Imperador and Culebra cuts?

General ABBOT. I am speaking now of where we have been digging in the hard material.

The CHAIRMAN. I understand that. Is that true up to the top of that Culebra or Imperador cut?

General ABBOT. No, sir.

The CHAIRMAN. How far below the apex, the top of the cut, is it to where you get to this hard material of which you speak; how many feet?

General ABBOT. I may be able to give an approximate answer by reference to this section of the cut. I can not be confident of accuracy, but should think about 50 feet; the maximum possibly might be 100 feet, but I think a fair average estimate of the thickness of that soft material would be about 50 feet. That is not given as accurately as could be done if I had a different map here.

The CHAIRMAN. As I understand your testimony on that point, it is that there is a substratum that you are working in now, consisting of an indurated clay schist?

General ABBOT. Yes.

The CHAIRMAN. Superimposed on that is other material?

General ABBOT. Decomposed material, rotten material.

The CHAIRMAN. Does that decomposed material extend clear to the top of the Culebra cut?

General ABBOT. Yes.

The CHAIRMAN. Now, is it in that rotten material that you find the slides that have taken place heretofore?

General ABBOT. In that rotten material they did encounter them when they were digging. We have not been digging in that.

The CHAIRMAN. I know; but it is in that material that you found the slides heretofore existing?

General ABBOT. That is where they were found.

The CHAIRMAN. And that, still, unless it is drained properly, is liable to slide?

General ABBOT. Yes, sir.

The CHAIRMAN. You expressed the opinion that the property of this canal as it stands to-day is worth more than \$40,000,000.

General ABBOT. I think so; yes, sir.

The CHAIRMAN. What do you include in that estimate—the houses?

General ABBOT. I include that which the offer includes now, as I understand it—the Panama Railroad, the excavations, the concessions, the hospitals, the buildings, the land, the plant on the Isthmus—in fact, all the property of the company. They own considerable land. The purchase at \$40,000,000 buys the Panama Railroad and the canal. The Panama Railroad and the new canal company together own nearly all the land that is necessary for the canal across the Isthmus.

The CHAIRMAN. Do you mean they own it in fee or that they have a lease of it and it is forfeitable if they do not complete the canal within the time mentioned in the concession?

General ABBOT. I do not know anything about the legal conditions of ownership. I know the land is included and goes with the property, and that is all I know about it. That would, of course, render it unnecessary to make extensive purchases of land for the purpose of the canal.

The CHAIRMAN. Has any work been done there that remains to-day in aid of a new canal besides what you have mentioned—the railroad and the buildings, etc., except dredging and the removal of earth?

General ABBOT. Yes; the investigations are worth not only a large sum in dollars, but even more from saving much time. We know what has been going on there for seventeen years.

The CHAIRMAN. What do you mean?

General ABBOT. I mean the investigations. They have developed thoroughly the Chagres River, and all questions involved in its regulation, the question of rainfall—in a word, all those data which would not only take much money but many years to secure.

The CHAIRMAN. In purchasing this property by the United States, of what value are those investigations to the United States?

General ABBOT. That would be a matter of guess. I have no means of making an estimate; but I say they enable the canal to be immediately constructed with definite knowledge, while without them it would be necessary to spend several years in getting them up and you would lose a vast amount of time before you could determine the information.

The CHAIRMAN. I will take the cubic yards of earth that have been dug the whole way out of the channel of the canal, whether in the Culebra, the Imperador, or in the sea or anywhere else.

General ABBOT. Yes.

The CHAIRMAN. The cost of removing that earth is a matter that is ascertainable at the unit price of labor that you operate upon?

General ABBOT. Yes, sir.

The CHAIRMAN. And no matter what it cost the Panama Canal Company, if the United States had the advantage of that work now, is it worth anything more to them than the cost of the digging and the removal?

General ABBOT. The point to be considered would be the unit price. Undoubtedly a unit price could be fixed upon that property, which would measure accurately the value; but I should not give the unit price which is applicable to the total completion of the work, because the cost is always more at the beginning of the work than toward the end, when you have everything well arranged. So I say that with

proper unit prices that would be a fair mode for estimating value, but in applying it to work which was done under very different circumstances a unit price based on conditions now existing would require a careful adjustment of that unit price.

The CHAIRMAN. We are not undertaking to pay the Panama Canal Company for its losses in handling this work. If we did, it would cost us \$250,000,000.

General ABBOT. Exactly. Nobody thinks that.

The CHAIRMAN. What we pay for it is what it would cost us to do that work which is done there now, per cubic yard.

General ABBOT. If you include that, of course there are items which have a value that can be easily computed; there are other items which are difficult. Now, take the question of plant. The supply of plant is enormous on the Isthmus.

The CHAIRMAN. We are not speaking of that now. I am talking about the work that is done there aside from the plant.

General ABBOT. The digging?

The CHAIRMAN. Yes.

General ABBOT. Well, I answer that with a fair unit price that would give a fair estimate of the value, but I do not think the unit price for which we could complete the whole work would be a fair unit price.

The CHAIRMAN. Well our Commission, or the Isthmian Canal Commission, estimates for the canal excavations, and that means, of course, the removing of the dirt to the dump, \$21,020,386. Is that a fair price?

General ABBOT. They do not give their figures, and it is impossible for any engineer to base technical opinions on that report until their appendices are printed. Until that is done it is impossible to know the reasons on which the decisions were based, or to decide on the value of excavation not included in those figures.

The CHAIRMAN. How do you arrive at any conclusion or calculation at all unless you get your estimates?

General ABBOT. I do it in this way: When that property was transferred from the old company to the liquidator, there were two parties, both of whom was very much interested in having a fair estimate put on the property; the liquidator, so that he should not become responsible for more value than he received, and the old company in order that they should get justice for all they turned over. That property was valued—estimated at the time by competent authorities, and the estimate I do not remember exactly, but it was somewhere in the neighborhood of \$90,000,000, and the company has spent about \$10,000,000 since that time.

The CHAIRMAN. You are gauging your estimate on that arrangement?

General ABBOT. Yes; that is my personal opinion; I have not been called upon to figure on any of these estimates.

The CHAIRMAN. They go on here in their estimate, canal excavation, Chagres diversion, Gatun diversion, and railroad diversion, and it amounts in all to \$22,895,028, being its present value to the United States.

General ABBOT. Yes.

The CHAIRMAN. Then they put upon that contingencies of 20 per cent.

General ABBOT. Yes.

The CHAIRMAN. What for?

General ABBOT. We always have to have contingencies.

The CHAIRMAN. When you are selling a piece of property?

General ABBOT. When buying. We estimate what it would cost us to do that work and add a percentage for contingencies. The sum gives the total.

The CHAIRMAN. Then it means that we could do that work for 20 per cent contingencies added to the calculation of its actual measurements by cubic yards?

General ABBOT. Of course the Isthmian Canal Commission are the persons to explain these estimates. I have no knowledge excepting the general practice of engineers.

The CHAIRMAN. I know, but I want to get your understanding of what they mean. I do not understand what they mean, because they estimate the actual excavation and the actual diversion of these rivers and the railroad at a certain round sum of money that it would cost to do that work. That must have been based upon a unit of prices, of course.

General ABBOT. Probably they based that upon the unit prices for the entire work, which I do not consider to be fair. They ought to increase those unit prices when only the easiest part is left for us to do.

The CHAIRMAN. Then it amounts to this, that your calculation is that we ought to pay because the work cost a larger proportion in the opening than it would cost to do it now.

General ABBOT. I think we ought to be willing to pay more than the standard unit price for the whole work.

The CHAIRMAN. But when we come to calculate what it is worth to the United States, what that work is worth there to the United States as it lies in the dump and as the excavation remains to represent it, we make no allowance for contingencies on that.

General ABBOT. Why yes; because of the errors made in our unit prices.

The CHAIRMAN. Is there any engineering rule that requires a man who sells a house to put 20 per cent on it for the contingency as to what it cost him to build it?

General ABBOT. No, sir; there is no obligation for that, but if a man is going to buy a house partly built and wants an estimate of what it would have cost him to construct that portion, he has to make his contingency addition.

The CHAIRMAN. As a matter of course, as to the additional part. This is not as to the additional part. It is as to what is actually built.

General ABBOT. Yes.

The CHAIRMAN. We turn over to the next page (103 of this report) and we find this total sum of \$27,474,033. Added to that is the Panama Railroad stock at par \$6,850,000; maps and drawings and records, \$2,000,000, "to which add 10 per cent to cover omissions."

General ABBOT. Such omissions as are now included in the offer—all the plants on the Isthmus, the hospitals, and its lands—have come in since, and are not included in that \$40,000,000. I do not believe their value is covered by 20 per cent.

The CHAIRMAN. Come in since when?

General ABBOT. Since that estimate was made. What the com-

panies now offer is not only what the Isthmian Canal Commission estimated for, but also the hospitals, buildings, and land—all the plant, including many locomotives and large valuable dredges, etc. These were not included in this \$40,000,000. This is a good illustration of the need of adding a contingency. The Government is to get things which the Commission overlooked.

The CHAIRMAN. How does that apply to the Panama Railroad stock at par? Is there any contingency of 10 per cent on that?

General ABBOT. I do not understand that estimate; I do not know the basis on which par value was adopted.

The CHAIRMAN. Maps, drawings, and records, \$2,000,000.

General ABBOT. That is very cheap.

The CHAIRMAN. Now, what are they? I do not mean the details of them.

General ABBOT. They consist of most careful and elaborate surveys through a very difficult country, where you have got to cut away bushes and make roads through dense jungles, borings and pits for determining the character of the soil below, carrying lines of level around the perimeters of the lakes, the daily observations upon the Chagres River at three different places, the meteorological observations, which we have now for many years, and a vast amount of information which I would not undertake to enumerate without taking too much time. The whole forms material which is not really costly in itself, but much of which would be impossible to collect without allowing a like number of years to pass by.

For example, if a complete system of records covering the Nicaragua Canal line, corresponding to these which we have at Panama, could be procured, I should consider, as an engineer, several millions a fair price for them provided work was to begin at once. They might save a large sum in expenditures now depending on data more or less uncertain. The Canal Commission draws attention to the fact that even the fundamental problem of regulating the lake level rests on insufficient hydrographic records.

The CHAIRMAN. Very good. Now, this canal route that you speak of through Nicaragua has been surveyed five or six times.

General ABBOT. I am speaking about the meteorological and hydrographical portion of it.

The CHAIRMAN. Well, we have had that for a number of years. We have had the survey of Childs.

General ABBOT. But I am speaking of —

The CHAIRMAN. Everything we have got we have paid for them all.

General ABBOT. We have not a long-continued rain record on that line except at one station near the west coast, and those rain records are vital to the solution of the problem.

The CHAIRMAN. What are they vital to?

General ABBOT. To determine the probable vacillations of Lake Nicaragua.

The CHAIRMAN. How are they vital on the Panama route?

General ABBOT. For similar reasons. We want to know how much rain falls, what is its effect on the Chagres River, what are the exact flood and low water conditions that we have to depend upon in planning and operating the canal.

The CHAIRMAN. Don't you know?

General ABBOT. We have had observations there for fifty years.

The CHAIRMAN. Then it is the observations that we are paying for and not the map?

General ABBOT. This data of the company consists of the maps, the engineering studies, the data to which I have been referring, and many other items.

The CHAIRMAN. They say maps, drawings, and records?

General ABBOT. They include under records these things. They include under records this information.

The CHAIRMAN. Then you are to understand that we are paying in this \$2,000,000 for all the work that has been done by the Panama Canal companies, both of them, in the accumulation of all the facts that they have made a record of, not for the record itself, but for the work done in the accumulation of facts necessary to make the record?

General ABBOT. What is the difference between the two? I think they are the same.

The CHAIRMAN. If you will take care of the question, I will take care of the difference.

General ABBOT. I want to understand the difference.

The CHAIRMAN. I am not on the witness stand.

The last question of the chairman was repeated.

General ABBOT. I consider that the record itself is what we are buying; that it represents value; and I estimate that value by considering the cost and the conditions under which it has been accumulated and what good use I can make of it.

The CHAIRMAN. For the information that it conveys?

General ABBOT. Yes.

The CHAIRMAN. As to all of your experiments?

General ABBOT. The knowledge which enables us as American engineers to take hold of that problem.

The CHAIRMAN. Do you know of any reason for putting 10 per cent on that after you cut it down to \$2,000,000?

General ABBOT. It is the usual rule.

The CHAIRMAN. Is there any reason for it; is it just to do it?

General ABBOT. If I were making that estimate—it is not my estimate, and of course I do not want to be put in the position of criticizing the estimates of the Isthmian Canal Commission—all I want to say about it is this, that if I had made that estimate I should have made it more than \$2,000,000.

The CHAIRMAN. I have no doubt that you would.

General ABBOT. Perhaps I know more about it than they do. I have worked with it for the last three or four years and I have known the enormous labor and value that it represents.

The CHAIRMAN. Can this canal be constructed by American engineers, take it just as it is, by putting their men there with levels and all other apparatus, machinery necessary to measure off that ground and go and do the work, including the dams and the excavations and all embankments—can these American engineers, without the assistance of these maps, go there and do that work?

General ABBOT. They would have to spend time enough to accumulate this information themselves.

The CHAIRMAN. Wouldn't they get the information by simply putting their instruments on the ground and measuring it?

General ABBOT. Not at all, because the fundamental conditions of the problem depends on knowing how much water is coming down.

You can not decide the height of your dam or any of these questions without knowing definitely what you have to provide against.

The CHAIRMAN. They have stated all those facts in their report; they have stated the cubic feet of water that flows per second through the Chagres River and will flow through the locks, and all of the hydrographic operations were stated in the report.

General ABBOT. Yes, sir.

The CHAIRMAN. How did they get that information?

General ABBOT. They got that from the company, I presume.

The CHAIRMAN. On what terms did they get that?

General ABBOT. Free gratis; for nothing. The company carried the principle even too far, I thought. When the Canal Commission was in Paris Admiral Walker desired to pay for copying some very bulky old maps and diagrams which probably would cost a hundred dollars or more to copy, but the company refused to accept anything, as they desired the United States to thoroughly study the plans.

The CHAIRMAN. Then this is a gratuity on the part of the Isthmian Canal Commission in offering \$2,000,000 for what they received gratuitously.

General ABBOT. A gratuity?

The CHAIRMAN. Yes.

General ABBOT. What the Commission received they received for their own information in studying the plans, but I presume they did not consider that if the property was to be bought for the use and benefit of the Government that the latter could accept free gratis from a private company that which had cost vast sums, and which would be worth much in the construction of the canal. Between private parties such action would appear like spoliation, and on the part of the Government it would be discreditable. I presume that was the sentiment which actuated the Commission.

The CHAIRMAN. It is therefore a gratuitous act for sentiment; it was not demanded.

General ABBOT. This is a point of ethics which the Isthmian Canal Commission must answer for themselves.

The CHAIRMAN. Is it anything else but a point of ethics?

General ABBOT. Well, I, as an agent of the Government, would not be willing to deal with a private company that was courteous enough to let me see what they had before I bought it, and then say that having thus acquired this information I would not recommend that it be paid for.

The CHAIRMAN. Well, would you feel under that condition of sensibility when three times, in letters, that company has been here to ask us to go and avail ourselves of all the information they possess in order to make up an opinion that they supposed us to be ignorant about, as to whether that Panama Canal was going to be successful or not?

General ABBOT. That is a matter of ethics, as I say.

The CHAIRMAN. Is it anything else but a matter of ethics?

General ABBOT. It seems to me it is a matter of honor; national honor.

The CHAIRMAN. Is it anything else but a matter of honor? Is it a business transaction?

General ABBOT. My idea is that a business transaction should always be conducted on the part of the Government with a high standard of honor.

The CHAIRMAN. And if a man comes and asks you to accept a thing, do you always expect to pay for it after you get it?

General ABBOT. Yes. If he only meant to exhibit its value and I took possession of it and carried it off and deprived him of all use of it.

The CHAIRMAN. But suppose you have the use of it for all the purposes that you want?

General ABBOT. That is the point. That is a point that perhaps you and I differ on, but I think that it would be something that would not be creditable to the United States, after a company had permitted their property to be seen and had given free access to all their data, to say, well, I have learned all that is necessary for my purpose, and I will not pay for the right to make practical use of it.

The CHAIRMAN. We have surveyed the Nicaragua Canal four or five times at an expense of more than \$2,000,000 and left it open to the world, everybody to come and take the data as they pleased out of our publications. Now, if the Frenchmen should take this \$40,000,000 and make an arrangement with Costa Rica and Nicaragua to build this canal, as they could easily do, would you expect then that we should go to them and demand of them \$2,000,000?

General ABBOT. No; that is information published to the world.

The CHAIRMAN. Were not these other things published to the world?

General ABBOT. No, sir; they were exhibited to agents of our Government; they are not published to the world.

The CHAIRMAN. Then you do not see any reason for charging 10 per cent premium on it?

General ABBOT. I must really decline to argue upon the estimate made by the Commission. I have no doubt the gentlemen are competent to settle these matters and answer them and explain them. It is beyond my province.

The CHAIRMAN. Well, you see we have to go down into the pockets of the people and get the money, the \$2,000,000, to apply it to this obligation. Now, what right have we got to pay something for nothing?

General ABBOT. I do not consider it nothing. I consider, as an engineer, that property is worth a good deal more than \$2,000,000.

The CHAIRMAN. When the French people put this information into the possession of our Commission and insisted upon our knowing it, when you came across the water to testify here, to inform Congress of these very same facts, do you then consider that there is any debt of honor on the part of the United States that we should pay that \$2,000,000 with 10 per cent on it?

General ABBOT. I think we should pay a liberal price, and that it should be graded upon the dignity of the Government, rather than upon a basis of close computation.

The CHAIRMAN. Is it not graded more by the duties of the Government to the people who have to pay these taxes than anything else?

General ABBOT. I think that the people would not be satisfied with a government which would not conduct itself on a high moral plane.

The CHAIRMAN. You mean on an engineering standard?

General ABBOT. On a regular engineering standard, a regular engineering method. If a railroad company sells its property with its maps and materials there is no doubt they would expect to receive a certain value for it.

The CHAIRMAN. Do you know of any engineering standard for adding

to the cost of that railroad stock? Now, we have put 10 per cent more on that.

General ABBOT. All that is a criticism of the Isthmian Canal Commission.

The CHAIRMAN. Well, I am not making any criticism of it; I am trying to get at the facts for the use of Congress and the people of the country, and, as a witness, I ask you that question.

General ABBOT. All I know about it has been stated. I have no more knowledge than you have on such matters.

The CHAIRMAN. I do not ask you for your knowledge. I ask you whether you consider it a debt of honor, for instance, that we should pay 10 per cent on the face value of that railroad stock.

General ABBOT. I consider really, if you ask my views—I, who am no financier, and who have no knowledge in financial matters, I, who should consult a lawyer if I were going to do any important business of that kind—that what the value of that stock is is beyond my knowledge.

The CHAIRMAN. You have not answered my question, whether you considered that a debt of honor to put 10 per cent on top of that railroad stock.

General ABBOT. I consider it a debt of honor to pay a proper value for that stock. What that is I do not pretend to know; as an engineer, it is not my business.

The CHAIRMAN. In your deposition in answer to questions put by Senator Hanna, or in the course of your deposition, you stated that nature had made the Panama route the one that we should adopt.

General ABBOT. I said it made the Panama route so much better than any other that it was our policy to adopt it.

The CHAIRMAN. In what particular has nature made the Panama route any better than any other?

General ABBOT. It has made it better in shorter length. Taking Nicaragua as the only other one really worth considering, it is about one-quarter as long. The summit level need be only about half as high. The nature of the country is such that a very fine canal can be made through it, with a curvature better than any large canal in the world, whereas in Nicaragua for 50 miles or more you have to follow a river which is terribly crooked and where, even after spending a great deal of money on it, it is impossible to introduce curves which will give the radius necessary to meet the requirements of large traffic, as demonstrated by experience in the Suez Canal, whose curves have had to be increased beyond those possible in the Nicaragua River.

The CHAIRMAN. Possible?

General ABBOT. Yes, possible, within the limits of reasonable expense. I accept the Canal Commission's report, of course, and they have made cut-offs wherever they could, adopting curves as large as would be possible without paying extravagantly for them. They have made them as large as they could, but they could not possibly attain the standard they desired. They had to adopt about 4,000 yards when they wanted——

The CHAIRMAN. You mean there were natural obstructions that prevented it?

General ABBOT. The river is so crooked.

The CHAIRMAN. Do you mean there were natural obstructions that prevented the possibility of their making a curve with larger radius?

General ABBOT. At a reasonable expense.

The CHAIRMAN. You put in the reasonable expense?

General ABBOT. They put it in; I am quoting them.

The CHAIRMAN. They do not say "possible."

General ABBOT. I will take back the word "possible." I say upon their idea of judicious engineering expenditure they make the radius as large as possible.

The CHAIRMAN. Let us get on with nature. What else has nature provided besides these curves?

General ABBOT. It furnishes in Nicaragua a rainfall which is a very serious matter for a large ship navigating the canal, as it obscures the view very much. It may rain any day in the year on the whole eastern portion of the Nicaraguan Canal, whereas in Panama there is only about half as much total rainfall.

The CHAIRMAN. Do you include in that statement that the rainfall is every day throughout the year upon the entire line of the Nicaragua route, or only about one-sixth or one-tenth or it?

General ABBOT. As far, so I understand the Commission to say, as to the point of where the dam is situated, which is the worst part of the navigation through the canal proper.

The CHAIRMAN. That is not more than 40 miles out of 183. Now, the balance of that route, everybody says, and I want to see whether you agree with them, that the rainfall is moderate.

General ABBOT. The rainfall there is moderate comparatively to the eastern portion; it is the same thing as in Panama. There it is 130 inches at Colon, 94 inches in the interior, and 57 inches on the Pacific coast.

The CHAIRMAN. I can take these rain gauges they have got here and tell you the same thing about Nicaragua with equal precision.

General ABBOT. Only they are in greater volume.

The CHAIRMAN. Only in one spot.

General ABBOT. No, sir; the appendixes to the Walker Nicaragua report contains tables of rainfall, all they could get and all they could collect notes for themselves. They show it to be very true that there is much less rainfall on the Pacific side, but they still show that the rainfall there is more than our figures show it to be for the corresponding parts of the Panama route. It diminishes, not by an arbitrary line, but by a gradual dropping off. Exactly there is where they want more data on the subject, and where they state that they can not specify definitely the fundamental basis for regulating the level of Lake Nicaragua, because they had to estimate the rainfall from one station while they wanted it at a great many.

The CHAIRMAN. Well, General, I am not asking you for a general or special criticism upon that report. I am asking you for certain facts that you can certainly state, if you will do so, in a very brief way and not to do injustice to any person in the world.

General ABBOT. I only want to guard myself——

The CHAIRMAN. It is not necessary for you to guard yourself or themselves in criticising the works of other men.

General ABBOT. I want to have go clearly upon the record what I clearly understand.

The CHAIRMAN. I understand you; you are making an argument for the Panama Canal, and you have been doing it all the day.

General ABBOT. No; I am trying to tell the truth.

The CHAIRMAN. In regard to this rainfall, does that obstruct navigation?

General ABBOT. Yes, by obstructing the view. It makes it difficult to steer a ship. A heavy rainfall is like a fog, and a pilot directing a large ship does not dare to go through the canal at a high speed.

The CHAIRMAN. Have you ever seen a fog in Nicaragua or Panama?

General ABBOT. I have never been in Panama, and I have never been in Nicaragua long enough to learn the fact. I am speaking of the rainfall which would obscure the view.

The CHAIRMAN. I do not know. I have seen through rainstorms in Hawaii almost as clearly as if no rain were falling.

General ABBOT. Those heavy rainfalls, I think, would scare a pilot in a difficult bend.

The CHAIRMAN. It looks to me as if that argument is not very substantial. Now, in what other respects has nature provided this as the proper route for a canal?

General ABBOT. The exemption from danger of earthquakes is another one.

The CHAIRMAN. How many earthquakes have occurred in the last century in Panama?

General ABBOT. I can not give you the exact figures, but the earthquakes there can often be traced to volcanic disturbances at a distance, and they are much reduced in the transmission.

The CHAIRMAN. I am not asking you that. I am trying to get you to state how many there have been.

General ABBOT. I will tell you something definite. I know the relative stability of the earth during the last year very definitely at two places. The Government has reestablished, beginning from the 1st of January, the old meteorological station at San Jose de Costa Rica, not far from Greytown. Observations are reported monthly of earth tremors and earthquakes, and in ten months they have reported 43 tremors, 8 of which were sensibly felt as shocks, and 2 of them made the people run out of their houses. We have had similar observations going on for nearly double that time at Panama, and we have had 5 tremors, of which only 1 would be sensible to the population. That speaks for itself.

The CHAIRMAN. The Isthmian Canal Commission report that there have been within a century 14 earthquakes in Nicaragua and Costa Rica and 28 in Panama.

General ABBOT. Well, sir, their data for that is something which I do not vouch for.

The CHAIRMAN. You just take issue with them; that is all.

General ABBOT. I take issue with them on the fact that I have the opinion of competent geologists who have investigated the subject thoroughly, and they make a very different showing.

The CHAIRMAN. In all these earthquakes you speak of has any material damage been done to any structure or building?

General ABBOT. Very serious damage has been done within the last three or four years in Nicaragua, or just beyond the boundary, at Salvador; they had a church thrown down there in 1897 or 1898, I think.

The CHAIRMAN. Was that in Salvador or Nicaragua?

General ABBOT. I think in Salvador; it was near the boundary.

The CHAIRMAN. Up above this canal?

General ABBOT. Yes.

The CHAIRMAN. What has occurred in Panama at the same time or at any time?

General ABBOT. So far as I know, of my definite knowledge about Panama——

The CHAIRMAN. I am not calling for your definite knowledge, but the same kind of knowledge that you are giving us about earthquakes in Salvador.

General ABBOT. There has been no earthquake since I was connected with the company in Panama that I ever heard of.

The CHAIRMAN. Before that time?

General ABBOT. They have had two, I believe, in the past century. I am vaguely of the impression that they have had a couple of earthquakes—something like that.

The CHAIRMAN. Don't you know that the houses of Panama, many of them, were torn down, and that the wells were made dry, and that the people had to go out far into the country to get water in consequence of earthquakes?

General ABBOT. No, sir; and what is more, I do not believe it, because there is a very ancient flat arch standing there, very thin, on the old convent of Santo Domingo in Panama; and if there had been any such convulsion, it could not have failed to fall.

The CHAIRMAN. What else has nature done for Panama to make it the available and preferable route?

General ABBOT. It has given them facilities for very much better harbors without encountering the very difficult and uncertain conditions involved in improving the harbor of Greytown.

The CHAIRMAN. You have a harbor at Panama $3\frac{1}{2}$ or $4\frac{1}{2}$ miles from deep water to Boca Rio Grande that has to be dug out, and you say it is a better facility than one that has to be dug out at Brito.

General ABBOT. Boca Rio Grande—I do not know where you mean.

The CHAIRMAN. The mouth of the Rio Grande on the canal, the mouth of the canal on the Panama Bay.

General ABBOT. Oh, above La Boca. We call it La Boca. I think that there is no question that the harbor of the Panama route attained through the excavation leading to Isle Naos is a far better harbor than an excavated harbor at Brito. It has been used for four hundred years and has given no trouble, and the Isthmian Canal Commission estimate nothing for the cost of maintenance there. It is a good harbor, whereas they estimate a certain price for maintaining the harbor at Brito.

The CHAIRMAN. You have not read that report if you make that statement advisedly, because they do estimate for the maintenance of it a very large sum—for the maintenance of dredging the channel out to the island of Naos.

General ABBOT. I may be wrong, but certainly I saw it stated not very long ago—I am not speaking about maintenance now. I am right, Senator. They estimated \$100,000 for maintenance at Greytown and \$30,000 for Brito, and \$50,000, I think, for Colon, but nothing at all for Panama. You are confusing the maintenance and the cost of first construction.

The CHAIRMAN. No, sir; I am not confusing it in my own mind. Now, is that channel that is out there $4\frac{1}{2}$ or $2\frac{1}{2}$ miles long, or whatever it is, is that a provision made by nature?

General ABBOT. No, sir; that is an artificial dredged channel.

The CHAIRMAN. You do not include that in the natural advantages?

General ABBOT. I include that as part of the canal. The natural harbor is at its outer terminus.

The CHAIRMAN. We scarcely need to debate the question as to whether a ditch dug through the bottom of the bay is a natural advantage.

General ABBOT. That is not the harbor, sir; that is the way you get to the harbor. I am speaking of the harbor at Isle Naos.

The CHAIRMAN. Well, without that ditch through there ships had to unload with lighters at $3\frac{1}{2}$ to 4 miles away from the coast.

General ABBOT. Yes; they had done that always until within the last two or three years.

The CHAIRMAN. What other natural advantage do you speak of?

General ABBOT. Let us see, I have mentioned the length, the degree of curvature—well, I will name one, the exemption from the necessity of regulating the level of a great lake like Nicaragua.

The CHAIRMAN. The difference between regulating a great lake and a smaller one, I suppose you mean?

General ABBOT. No, sir.

The CHAIRMAN. Has nature provided a smaller lake at Bohio that takes care of itself?

General ABBOT. That is easily regulated by our canal works.

The CHAIRMAN. I am speaking of the provision of nature.

General ABBOT. An engineering plan enables you to easily control lake Bohio, while nature prevents you from adopting a similar plan in the other place.

The CHAIRMAN. At what cost is this first control obtained, according to the report of the Isthmian Canal Commission, over the lake and dam at Bohio?

General ABBOT. That is a matter I should have to look up.

The CHAIRMAN. It is about \$13,000,000 or \$14,000,000, is it not, including the spillway?

General ABBOT. Oh, the construction of the works, you mean?

The CHAIRMAN. Yes. At what cost is it necessary to provide by art to help out this provision of nature for a dam at Bohio?

General ABBOT. I think the ambiguity in our understanding arises from the word "nature." I consider that where a man has a facility for obviating a difficulty at one locality and can not avoid it at another, owing to natural conditions, that the merit is properly classed as due to nature.

The CHAIRMAN. Do you include in your estimate of the natural advantages of Panama the large city that lies within 3 miles of the canal line?

General ABBOT. I do not think that makes any very great difference. It would be necessary to have it under police control, so as not to cause annoyance or trouble, but the canal does not go through the city of Panama.

The CHAIRMAN. Within 3 miles of it.

General ABBOT. Yes; but so far as that is concerned, the ships will not have anything to do with Panama unless they choose to.

The CHAIRMAN. Do you suppose the Panama people will have nothing to do with the canal?

General ABBOT. I have no doubt the place will grow and develop very much.

The CHAIRMAN. It has got to be under the police control of some body?

General ABBOT. Yes.

The CHAIRMAN. Of whom?

General ABBOT. That is a matter beyond my province; that is a matter for the lawgiving power.

The CHAIRMAN. That is not a natural advantage to the canal location, then?

General ABBOT. No, sir; I do not so consider it. I do not consider nature has anything to do with that matter.

The CHAIRMAN. Those people in Panama are not of a very high grade or quality of people as an average, are they?

General ABBOT. I do not consider very many of them to be so.

The CHAIRMAN. Is that any advantage to the proper sanitation of the Isthmus across there?

General ABBOT. I do not think it is any annoyance one way or another; I do not think we would allow them to annoy us in any way.

The CHAIRMAN. You do not consider, then, the necessity of providing sanitation for them as one of the natural advantages of Panama?

General ABBOT. No; I should think that would be a disadvantage, undoubtedly.

The CHAIRMAN. Has nature provided a very wholesome climate there for human beings from Colon to Panama?

General ABBOT. I do not think the difference in climate between the two amounts to much—I can hardly make a comparison. Nicaragua is very largely a wilderness, and never has been tested by a dense population. Panama has been developed in that respect because of the railroad and the digging done in the canal.

The CHAIRMAN. It seems you can not possibly avoid referring to the Nicaragua Canal, when I ask you about Panama. I asked you if nature had provided any advantage in favor of Panama over all of the other routes—that is what my question implied. In the health of the particular locality between Panama and Colon along the line which this canal is to be constructed, has nature provided any advantage in favor of Panama?

General ABBOT. Do I understand you to mean that the existence of those two cities is an advantage? We do not understand the word “nature” exactly between us.

The CHAIRMAN. No; I do not think I understand you or nature either, according to your statements.

General ABBOT. I think we have a different idea of the word.

The CHAIRMAN. I will repeat my question. It seems that you can not possibly avoid referring to the Nicaragua Canal when I ask you about Panama. I ask you if nature had provided any advantage in favor of Panama over all the other routes; that is what my question implied. In the health of the particular locality between Panama and Colon along the line which this canal is to be constructed, has nature provided any advantage in favor of Panama? Now, that is the question that I have been asking you.

General ABBOT. That has been the question that I have been answering all along. Is this a different question from what you have been asking before?

The CHAIRMAN. I am not trying to draw the difference; I just want an answer to that question.

(The question was again repeated to General Abbot.)

General ABBOT. No, sir; I do not think it has.

The CHAIRMAN. Now, have you got through stating all the advantages that nature has provided for that route over all the balance of the Isthmus?

General ABBOT. All that I recall at this moment.

The CHAIRMAN. How about the winds in the Bay of Panama?

General ABBOT. Oh, there is one; I forgot the winds. I would like to take them up in turn, if you please. It is a great advantage to the Panama Canal to be exempt from that continuous northeast trade wind which strikes the ships on the sides as they go through these curves in the San Juan River and makes it extremely difficult to navigate. The exemption from that is a great advantage. On the other hand, it is a great disadvantage to Panama to have that belt of calms outside, if sailing ships are to be considered. In respect to winds on the transit through the canal Panama has the advantage, but in respect to the absence of winds in the bay it has the disadvantage, although I believe that often the same trouble—getting into the belt of trades—extends up as far north as Brito, but undoubtedly Panama is worse in that respect, in that comparison.

The CHAIRMAN. Nature, therefore, has not done justice to Panama in the wind question?

General ABBOT. I don't know anything about the justice of nature. I would not criticise nature.

The CHAIRMAN. I am very sorry to think that nature has forgotten any favor that she could possibly have bestowed upon that delightful country. You do not regard an advantage to sailing vessels as being worth considering?

General ABBOT. My ideas with reference to sailing vessels have been somewhat shaken lately. It is generally admitted by naval men and others—we have always accepted it—that the construction of these ship canals is driving the sailing ships out of business.

I doubt very much whether either canal would be very much frequented by sailing ships on account of the expense of going through. I think that the item of towage applied the same length of route, say a couple of hundred miles, would carry the ship past both routes into the belt of winds, so that there would not be any very great difference in the transit of sailing ships.

The CHAIRMAN. How far off the coast of Panama are the sailing winds?

General ABBOT. The best information I have been able to get, based on statements from the Hydrographic Office, is that it varies from 125 to 200 miles.

The CHAIRMAN. We have the charts of the Hydrographic Office here.

General ABBOT. You may be better informed than I.

The CHAIRMAN. The charts say it is from 500 miles to 800 miles.

General ABBOT. As I say, of course, I have never been there.

The CHAIRMAN. You do not then regard the winds and the calm belt off Panama as being one of its peculiar natural advantages?

General ABBOT. The absence of wind in the bay, of course, I consider a great disadvantage, if I understand the question. I consider

the absence of winds off Panama to be a disadvantage to the Panama route.

The CHAIRMAN. Now, in overcoming the difficulties of nature, when you get to the Culebra cut, how deep do you have to go to get to the bottom of the canal that the Isthmian Canal Commission proposes to locate there?

General ABBOT. Well we proposed about 30 feet above the sea. The bottom here is given at 20 $\frac{1}{2}$ meters—no; I take that back. That was on the other variant with the three levels. We go down to 10 meters, that is about 30 feet above the level of the sea.

The CHAIRMAN. How far is it from there to the top of the cut?

General ABBOT. At the highest point, if I remember rightly, was originally about 335 feet.

The CHAIRMAN. Do you consider that a natural advantage in favor of the Panama route?

General ABBOT. That is through one point of ground. That is very much more than the general average.

The CHAIRMAN. I ask you the question if you consider that a natural advantage in favor of the Panama route?

General ABBOT. I do not consider it an advantage; I do not consider that the worst part of the line is an advantage. I would be glad to eliminate all of the bad parts.

The CHAIRMAN. I am not amusing myself about this. You are telling us what nature has done for the Panama route, and I want to know whether you included going down from the top of Culebra hill to the bottom of the prism of the canal a natural advantage.

General ABBOT. I consider that to be one of the disadvantages, I put it entirely on the other side.

The CHAIRMAN. Has nature provided any particular advantage there in getting rid of the earth that you take out of that cut or the rock?

General ABBOT. Yes; I think it has.

The CHAIRMAN. Wherein?

General ABBOT. Dumps at both ends, very convenient dumps to receive that material.

The CHAIRMAN. I would like to know where they are located, because the Colombian agents who made the investigation say that one of these dumps is filled up and that you have got to haul the earth out and put it into the bay of Panama.

General ABBOT. Oh, if you are going to them for information—that is perfectly ridiculous.

The CHAIRMAN. Well, he has made it in a report to the Colombian Government.

General ABBOT. That we have got to carry it and dump it into the bay in order to dispose of the Culebra cut?

The CHAIRMAN. Yes.

General ABBOT. Well, sir; I hope you will not believe him. He can not be an engineer.

The CHAIRMAN. He also says that the dumps that you had there while the old company was operating in comparatively easy earth of the cut and in the Culebra hill would soon be filled up, and that you would have to haul this stuff a very considerable distance to get rid of it.

General ABBOT. It is not so. Those points are engineering ques-

tions and have been investigated. There is no trouble about the dumps. I tell you that as an engineer.

The CHAIRMAN. You say, "I take great exception to the report of the Canal Commission as to the time of passage through Nicaragua," and then you state that the time that you allow for passing through that is 5 miles an hour?

General ABBOT. No; I allow 5 miles an hour where they are going through the bad portion of the route, and $11\frac{1}{2}$ miles an hour where they have the deep water in the lake. I am taking a 10-knot ship.

The CHAIRMAN. What is the ground of your exception to the report of the Commission on that subject?

General ABBOT. Because I think they have underestimated the time required to go through the Nicaragua Canal. I think it is absolutely impossible to go through that canal with a large ship in thirty-three hours. I have figured it, and I presented my figures to the committee this morning.

Allowing passage by night and day, the time of transit would be, in my judgment, forty-eight hours; and as I do not believe a large ship could navigate by night, I think the real time of transit would be nearer sixty hours; so that I differ entirely from the Commission on that point.

The CHAIRMAN. Well, then, when you turn to the Panama Canal, you shorten the period of time for going through?

General ABBOT. I reach the same result that the Isthmian Canal Commission has estimated. My figures happen to come out almost exactly the same. They have not put those computations in the part of the report already published, so they can not be technically discussed, but the maximum speed that is safe to allow in any canal has been fixed by experience at 6 knots. That is the rule in Suez, and in the Manchester Canal, and, I think, at Kiel. The ships are not allowed to go faster, in order to prevent injury to the canal. Now, my time, if you notice, 12 hours for Panama and 48 hours for Nicaragua, is just proportional to the length of the canals. That means that the gain from high speed in passing through Lake Nicaragua is lost on the other parts of the route owing to worst curvature, winds, difficulty in seeing from bad weather, and head currents. All those disadvantages, which are very serious retardations to the speed of a ship, do not affect the Panama route at all. The result is that it takes four times as long to get through, or a time in proportion to the length.

The CHAIRMAN. How much do you shorten the time on the Panama route below that of the estimate of the Isthmian Canal Commission?

General ABBOT. Well, I think it is the same. I think they say 12 hours, and mine is about that.

The CHAIRMAN. Do you make any allowance in your estimate for ships waiting for the tide to come in from the bay of Panama into the canal up to Miraflores?

General ABBOT. The present channel, of course, is made for mid-tide, but it is contemplated to deepen to low tide when the channel is completed, so that there will be no delay there.

The CHAIRMAN. There will be no delay if you have 35 feet of water in the channel?

General ABBOT. Or 30 feet, if our depth of 30 feet should be adopted. As long as you have full depth in the channel at low water there will be no delay.

The CHAIRMAN. Could ships pass each other in that channel?

General ABBOT. They could pass each other in the bay; yes, sir.

The CHAIRMAN. I do not ask you about the bay; I ask you about the channel.

General ABBOT. I am speaking about the channel in the bay. They could pass there well enough. It is 150 feet wide at bottom, and that is wide enough for two ships to pass easily.

The CHAIRMAN. Seventy-five feet wide is wide enough to pass each other?

General ABBOT. One hundred and fifty feet.

The CHAIRMAN. But twice 75 would be 150 feet.

General ABBOT. Yes.

The CHAIRMAN. When they are passing each other they occupy 150 feet.

General ABBOT. Oh, but that is the width at the bottom; at the top the side slopes leave ample width. I gave you the width at the bottom.

The CHAIRMAN. Do you make any allowance for northers at Colon Bay?

General ABBOT. They occur at the rate of about one or two a year, and they would be like any convulsion of nature; they would be something that when they did occur might or would probably interfere with the entrance, but they come so rarely that they are like the great floods in the Chagres River. They are not to be feared as an interruption to commerce.

The CHAIRMAN. You do not know exactly when to expect them, do you?

General ABBOT. They are so rare that I do not really know much about them. I know they are averaged not to occur more than one or two in a year.

The CHAIRMAN. You have estimated, therefore, without regard to the entrance at the bay of Colon, the possibility of low water in the canal in the bay of Panama in the time of coming over, and you have averaged it through the whole year?

General ABBOT. Including the whole year and allowing full depth in the canal, which we propose to maintain, so that there will be no delay at Panama, and omitting occasional or possible northers at Colon.

The CHAIRMAN. Well, I believe I have no further questions to ask you, General.

The committee then, at 5 o'clock p. m., took a recess until Wednesday, March 5, 1902, at 10.30 o'clock a. m.

57TH CONGRESS, {
1st Session. }

SENATE.

} DOCUMENT 253,
Part 3.

HEARINGS

BEFORE THE

SENATE COMMITTEE ON INTEROCEANIC CANALS

ON

H. R. 3110, FIRST SESSION FIFTY-SEVENTH CONGRESS,
IN THREE PARTS.

MARCH 14, 1902.—Ordered to be printed

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.

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STATEMENT

OF

CHARLES P. TREAT

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN) HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *February 15, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Hanna, Millard, Kittredge, Harris, Hawley, and Pritchard.

Mr. Charles P. Treat appeared and was duly sworn by the chairman.

STATEMENT OF MR. CHARLES P. TREAT.

The CHAIRMAN. You may state where you live.

Mr. TREAT. At the present time I am living in London, England.

The CHAIRMAN. You are a railroad builder?

Mr. TREAT. Yes; that is my regular business.

The CHAIRMAN. What roads have you built?

Mr. TREAT. I have built 500 or 600 miles of the Chicago and Northwestern; I built the Black Hills and Wyoming lines; I built some of the Illinois Central and some for the Atchison, Topeka and Santa Fe, and the last work I did was 210 miles in Maine for the Bangor and Aroostook Railroad. I also did some work in Nicaragua for the Nicaragua company.

The CHAIRMAN. What company did you work for in Nicaragua?

Mr. TREAT. The Nicaragua Construction Company.

The CHAIRMAN. That was the company that had a contract under the Maritime Canal Company?

Mr. TREAT. Yes, sir.

The CHAIRMAN. Who was the president of that company?

Mr. TREAT. Mr. Cheney, when I first commenced to work, and afterwards Mr. Warner Miller.

The CHAIRMAN. Well, state in your own way what work you did, how many hands you had and in what part of the country it was, how long it took you and what the cost was, etc.

Mr. TREAT. It was a peculiar contract. I took it for the purpose of studying the questions of labor and climate and health and supplies, having in view a large contract on the canal, and I said if they would give me control of the whole thing and not let the engineers interfere with me too much and would furnish what I wanted from New York I would build the railroad for 10 per cent of what I paid out for labor in the country, I paying my own office force and superintendent of construction. I commenced the work about the last of May, 1890, and finished my work about the last of December, 1890—I believe it was 1890.

The CHAIRMAN. What length of road did you build?

Mr. TREAT. Nearly 10 miles—perhaps a little less than 10 miles.

Senator HANNA. Standard gauge?

Mr. TREAT. Standard gauge.

The CHAIRMAN. Describe the point you started from and where you went.

Mr. TREAT. I started from the Greytown Harbor—that is, the lagoon—and went south of the canal line as located—parallel to it, perhaps a thousand feet away from it—directly to the westward, parallel with the canal line all the way.

The CHAIRMAN. Did you build out to the Deseado River, or stream?

Mr. TREAT. I think I crossed that; I am not sure.

The CHAIRMAN. What sort of a country was it that you went through?

Mr. TREAT. It was almost perfectly flat, you might say, covered with forests, the first 8 or 9 miles covered with water—completely overed with water.

Senator HANNA. How deep?

Mr. TREAT. From a foot up to over a man's head.

The CHAIRMAN. How did you construct a road through that water?

Mr. TREAT. I cut down trees and built a solid corduroy by laying the logs parallel to each other, perhaps 16 or 18 feet long, until I got above the water and then I laid rails on top of this causeway of logs and put a steam shovel at work where the entrance was to be for the canal and loaded flat cars there with the excavation. I had two trains of flat cars, fifteen cars to a train, and two locomotives, and then I hauled these cars out on this track laid on the logs, and used a ballast plow, and in time completely buried this foundation taken from the entrance to the canal. I actually commenced the construction of the canal by taking out about one hundred thousand cubic yards at that point, and in time of course I buried this substructure completely with sand. Of course, as these logs were covered with sand, the track was raised and the sand tamped under it until a substantial road was built.

The CHAIRMAN. Was it a substantial road?

Mr. TREAT. Oh, yes.

The CHAIRMAN. A good railroad?

Mr. TREAT. Yes. These logs under water, of course, will never rot, and as they rot above the water it is easy to replace that amount of material with sand. The problem was to get a roadbed at all through 8 miles of water. You could not take any material from the side.

The CHAIRMAN. You did not get any material from the sides?

Mr. TREAT. No, sir; none whatever, except the logs.

The CHAIRMAN. Was that swamp 8 miles through?

Mr. TREAT. About 8 miles; yes, sir.

The CHAIRMAN. When you got your road done, was it a substantial, strong road?

Mr. TREAT. Oh, yes; a good, substantial road. You could run at any speed over it.

The CHAIRMAN. Do you know anything about its present condition?

Mr. TREAT. I have not seen it since I finished it.

The CHAIRMAN. Well, now you described the sand you got out of that place where you had the steam shovel at work. What is that material?

Mr. TREAT. It is a sharp, angular sand; I should say a volcanic sand, I think, clearly.

The CHAIRMAN. Does it differ from the sand that is washed up by the sea ordinarily

Mr. TREAT. Ordinarily, yes; it is a sharper sand. It would be a good sand, I should say, for concrete or for mortar, sharper than the ordinary beach sand along the north Atlantic coast. It is peculiar in being sharp and rather a uniform-sized grain, as I remember.

The CHAIRMAN. What examination did you personally make of the country lying between Greytown and the rock divide there beyond Deseado, and between that line and the San Juan river?

Mr. TREAT. I have been all over that line. When I first went to the country I took an engineer with me, and we started at the Brito end and went over the whole line of the canal. That was before I undertook any of this contract, having in mind a contract in case the canal should be built. I have been twice over that line looking at it, as a contractor would look at material, and looking at the chances for waste banks, the chances for borrowing material if anything should be borrowed, though I do not think there would be any borrowing there; and then following up some of the water courses that cross the line of the canal to see what trouble there would be from flood waters in case they should come in onto the work as it was in progress. I looked at it in general as I would at any other work.

The CHAIRMAN. Would you say you made a careful examination of that country around there?

Mr. TREAT. Yes, I did. I made a careful examination of the line clear across from Brito to Greytown, especially on the western end. That was the part that I hoped to figure on, from the lake to Brito, but I did look at the whole line.

The CHAIRMAN. Well, did you find swamps in there in the country lying, I will say, between Greytown and Tampercito, or in that part of the country which has the San Juan River for its easternmost boundary; did you look through that country carefully?

Mr. TREAT. Well, there were swamps in the Deseado basin; there were swamps along the San Francisco and Dante streams. There were swamps in there; that is, the hollows between the hills were swampy. They were narrow, but they were swampy at the bottom. Then, of course, swamp all the way from the hills to the harbor at Greytown for a distance of 11 or 12 miles.

The CHAIRMAN. I will take the country that lies out of the circle that is made by the San Juan River after it leaves Ochoa and runs down toward the sea, and turns toward Greytown, that country in there—you know where I mean?

Mr. TREAT. Yes.

The CHAIRMAN. Are you acquainted with that country?

Mr. TREAT. I have seen a good deal, I think. I have been on the San Juancillo in a canoe and up and down the San Juan River and have been across at least two routes surveyed for the canal, so that I know pretty well that delta.

The CHAIRMAN. And you were there prospecting as a contractor with your own engineer to find out what you could, I suppose, by way of making money on a contract?

Mr. TREAT. Yes.

The CHAIRMAN. What difference is there, if any, in the general structure or formation of the soil along the line of the San Juan and along the line of the railroad that you built?

Mr. TREAT. Well, northwest of the San Juan I should say there was more soft mud on top. Along the line of the railroad the bot-

tom—that is, the surface of the ground under the water—was firm. There is scarcely a spot on the whole line of that railroad that we built where a man would sink into the mud walking along through the water. Over toward the San Juan River I should say there is more soft mud on top. I do not know how deep it is down to this hard sand below it.

The CHAIRMAN. Well, the general structure of the country; I would call it the body of it—do you understand, or did you come to the conclusion or form the opinion that it was of the same formation; that is, sand from volcanic origin?

Mr. TREAT. Yes; I should say that was all of the same formation, that flat in back of Greytown and north of the San Juan River.

The CHAIRMAN. Where embankments were thrown up or where you made the covering of the railroad by sending these cars across loaded with this stuff, did it stay there or wash away?

Mr. TREAT. It stood, because there was no current in this swamp; that is, the country is so very nearly level—it is so flat that there is no appreciable current; not enough to wash anything.

The CHAIRMAN. There is a great rainfall there, is there not?

Mr. TREAT. Tremendous.

The CHAIRMAN. What impression did that make on this embankment that you threw across this corduroy road?

Mr. TREAT. Very little; it did not make much while I was there.

The CHAIRMAN. You have built railroads in many countries?

Mr. TREAT. I have built railroads in a good many different States and Territories of this country.

The CHAIRMAN. What States and Territories?

Mr. TREAT. New Mexico, Colorado, Wyoming, Nebraska, South Dakota, Iowa, Minnesota, Maine, and I have done a little work in California and in Old Mexico.

The CHAIRMAN. That has been the business of your life?

Mr. TREAT. It was my business for fifteen years; yes, sir.

The CHAIRMAN. You say you built railroads in Maine?

Mr. TREAT. Yes, sir.

The CHAIRMAN. Whereabouts?

Mr. TREAT. I built the Bangor and Aroostook road, 210 miles; that is from the neighborhood of Bangor up through the back country to the northwest.

The CHAIRMAN. In that country did you find swamps as difficult as you found in Nicaragua?

Mr. TREAT. Fully as bad; I think worse—bottomless swamps, apparently. I have driven a pile down 60 feet, and put another one on top of that and driven another one down 60 feet, and the pile would go 5 feet at the last knock of the hammer.

The CHAIRMAN. You built a railroad on that?

Mr. TREAT. Yes, sir.

The CHAIRMAN. And it is still there?

Mr. TREAT. Yes, sir.

The CHAIRMAN. This railroad that you built in Nicaragua was 10 miles long?

Mr. TREAT. Yes, sir.

The CHAIRMAN. Was it a good, strong road?

Mr. TREAT. Yes, sir.

The CHAIRMAN. Sufficient for the purpose of conducting the canal work at the opening of that canal?

Mr. TREAT. Oh, yes; it was a first-class road as to ability to carry traffic. It was a good, substantial road.

The CHAIRMAN. Now, at what cost per mile was that road built?

Mr. TREAT. The whole cost was about \$30,000 a mile.

The CHAIRMAN. Where did you get your cross-ties?

Mr. TREAT. I got some from the timber alongside the track, and some cypress ties from New Orleans.

The CHAIRMAN. About how many men did you have under you while you were at work there?

Mr. TREAT. Perhaps a couple of hundred at the start up to the neighborhood of 1,000. I think I had nearly 1,000 after two months and from that up to the end.

The CHAIRMAN. How long did you keep them there?

Mr. TREAT. Seven months.

The CHAIRMAN. State what kind of work they did.

Mr. TREAT. Why, of course a large part of the work was right in these swamps, in water. I cut down the trees and cut them up into lengths, some very large trees, 3 feet in diameter, mostly very heavy timber that would not float, and the work was to drag these logs through the water; they would so nearly float that 20 to 30 men would tie a rope to a big log and drag it along on the bottom to the place they wanted it and then turn it around on to the line of the railroad, so that the work that these men did was wholly cutting these trees and putting them in place to form a part of the embankment, a foundation for the embankment, and fully half of the men were working in this water ten hours a day.

The CHAIRMAN. Every day?

Mr. TREAT. Yes; every day. Out of seven months we lost only two half days from any reason, and that was on account of cold rains.

The CHAIRMAN. And that is all the time that you lost?

Mr. TREAT. That is all the time that we lost. We did not work on Sunday.

The CHAIRMAN. Well, what was the condition of health of your men?

Mr. TREAT. Why, the first lot of men that we had there from Jamaica were a poor lot, picked up off the streets largely and in poor health, seemed to be half starved. I should say that their general health improved while they were on the work. At the end of the work they went away looking better and feeling better than when they commenced. They had good food, a good dry place to sleep, and when they were sick a good hospital to go to.

The CHAIRMAN. Now, if I understand you, you undertook this job down there, not with the view of making money, but you went there for the purpose of ascertaining what could be done in that country in the way of canal building?

Mr. TREAT. That is true.

The CHAIRMAN. With the expectation of bidding for a contract?

Mr. TREAT. Yes.

The CHAIRMAN. Then you were all over the country, I suppose, from Brito to Greytown?

Mr. TREAT. Oh, yes; and over a good many other parts of Nicaragua, up to Lake Managua and up east of the lakes.

The CHAIRMAN. Going around through the country generally?

Mr. TREAT. A good deal; yes, sir.

The CHAIRMAN. What kind of a country is that for residences and for agriculture, fruit growing, and the like of that?

Mr. TREAT. Well, I consider the country on the west side of the lake a very agreeable country, healthful, good for coffee growing and sugar making, and the east side is good for bananas and rubber growing.

The CHAIRMAN. Is that abundant?

Mr. TREAT. It was. It has been very largely cut down, but some rubber plantations are now being started in the country. It is likely to be a business, the raising of rubber.

The CHAIRMAN. Is it a productive country for rubber?

Mr. TREAT. Yes; rubber trees grow well.

The CHAIRMAN. Have you been up in the country to the northwest, I will say, of Lake Nicaragua, upon the hills there? I do not know that I have the compass right.

Mr. TREAT. That would be the country down toward Corinto.

The CHAIRMAN. Then I will say north.

Mr. TREAT. No; I have not been north much.

The CHAIRMAN. There are large coffee plantations and settlements up in there, are there not?

Mr. TREAT. I believe there are.

The CHAIRMAN. What is the name of that country?

Mr. TREAT. I do not recall it now. I have not been there for a number of years.

The CHAIRMAN. It has a designation of its own?

Mr. TREAT. Yes; it is a province.

The CHAIRMAN. Where there is a very considerable settlement of white people?

Mr. TREAT. Yes.

The CHAIRMAN. Well, you have been out to Corinto?

Mr. TREAT. Yes.

The CHAIRMAN. What kind of a harbor is that at Corinto?

Mr. TREAT. I think for ordinary coasting traffic—for vessels not drawing too much water—it is a good harbor. In fact, I do not know particularly about it. I have been in the harbor on the Pacific mail steamers.

The CHAIRMAN. At Nicaragua there, through from Greytown to Brito, do you consider it a healthy country?

Mr. TREAT. I do, indeed. I consider it to be a much healthier country than most tropical countries, very much. In fact, Nicaragua seemed to me just as healthy as the average part of the United States. I would just as soon do work there as in any part of the United States, so far as work is concerned. I ought to add about my laborers there on the work, that I had only two deaths from disease during that whole seven months out of the whole force. That would be a good record in any country.

The CHAIRMAN. Your force numbered 1,000 men, take them through and through, comers and goers?

Mr. TREAT. No, sir; comers and goers, there were a good many more than a thousand men.

The CHAIRMAN. About how many should you say?

Mr. TREAT. I should say somewhere between 1,500 and 2,000.

The CHAIRMAN. Men that would come and drop in and drop out?

Mr. TREAT. Yes, sir; I had quite a force; 200 or 300 natives, Costa Ricans and Nicaraguans, as well as Jamaicans.

The CHAIRMAN. Who paid for this work that you did?

Mr. TREAT. I did; I paid the bills during the month, and then at the end of the month the company paid me.

The CHAIRMAN. That is, the contracting company under the Maritime Canal Company?

Mr. TREAT. Yes; I was there for the Nicaraguan company.

The CHAIRMAN. Had they started the dredging of the canal when you left there?

Mr. TREAT. No, sir.

The CHAIRMAN. Had they dredged any in the bay?

Mr. TREAT. A little; not much.

The CHAIRMAN. Any under the lee of the breakwater that they brought through out there?

Mr. TREAT. Well, we brought the engines and cars and steam shovel through that channel by way of the breakwater.

The CHAIRMAN. How long had the breakwater been there when you brought it through?

Mr. TREAT. They were still working on it when I was there. I think it had been commenced a year or two before, I don't know just how long.

The CHAIRMAN. But you brought this ship in with the engines upon them and landed them upon the lagoon.

Mr. TREAT. We discharged from the ship on to lighters and brought the lighters through there.

The CHAIRMAN. How far out were the ships anchored?

Mr. TREAT. I should say $1\frac{1}{2}$ or 2 miles.

The CHAIRMAN. Do you know how far it is from that lagoon, I will take it, to half the length of that breakwater, out to the thirty-five feet curve on that coast.

Mr. TREAT. I think I remember that it is marked on the map at thirty-five hundred feet.

The CHAIRMAN. Yes, it is thirty-five hundred feet as contrasted with thirty-five hundred yards at Port Said. I don't know that I have any further questions to ask you.

Senator HAWLEY. Do you get pretty effective and faithful men out of the native Nicaraguans?

Mr. TREAT. I never had better laborers anywhere, and I have employed all kinds used in the United States. They were very faithful, and I should say, if I may go on a little further, for the work west of the lake there would be an abundance of native labor, Costa Ricans, Nicaraguans, and natives from Honduras and Guatemala. They were very faithful. For the work east of the lake there would be an abundant supply of negroes from Jamaica and all those West Indian islands that are now having dull times. There would be an abundant supply of labor from there, I think. As to labor, I think there would be less trouble, I should expect less trouble, on account of any labor combinations down there than in the United States. All these people want, according to what I found, especially with the natives, is fair treatment and fair pay.

Senator HAWLEY. They had not learned of labor unions or strikes?

Mr. TREAT. No, sir.

The CHAIRMAN. I will ask you about the dispositions of the people down there, whether they are quiet and orderly or fractious and irritable—the native people?

Mr. TREAT. I found them a very pleasant people. The only pre-

caution necessary was to keep the Jamaicans and the natives apart. They do not like each other.

The CHAIRMAN. It is a question between the negro and the Indian?

Mr. TREAT. Yes.

The CHAIRMAN. The old question?

Mr. TREAT. Yes; they will fight if they get together.

Senator HARRIS. Did the English Government ever take any step to interfere with or control the negro labor from Jamaica?

Mr. TREAT. No; I think they were perfectly free to come over. I never had any interference, and I got some laborers from Colon. I used to send a little schooner down there once in a while and it would come back full of men from Colon, who came off the Panama Canal.

Senator HARRIS. You went down there for the purpose of taking railroad contracts?

Mr. TREAT. Yes; this particular railroad contract. I went down more for the purpose of studying the questions of labor and climate and health and supplies, with a view to a large contract at some time on the canal.

Senator HARRIS. You are a railroad contractor and have done that kind of work?

Mr. TREAT. Yes.

Senator HARRIS. For what length of time?

Mr. TREAT. I did it for fifteen years. I have not done much for the last six years.

Senator HARRIS. Well, you investigated, then, while there, the figures on which you would base an estimate for a contract?

Mr. TREAT. Yes; I did.

Senator HARRIS. What do you think would be a fair price for a railroad as an auxiliary to the construction of the canal?

Mr. TREAT. Per mile?

Senator HARRIS. Per mile.

Mr. TREAT. It would depend where it was located there. This railroad that I built across the swamp was expensive.

Senator HARRIS. It would be necessarily contiguous to the canal line—that is, as near as possible for the purpose that I mentioned?

Mr. TREAT. Yes. Well, the road I built as far as it went was contiguous to what was known as the high-level location. That costs for that distance \$30,000 a mile, about, without equipment.

Senator HARRIS. Just simply for the construction?

Mr. TREAT. Simply for the material that went in the road, construction, and not including the cars and engines.

Senator HARRIS. That is the material you mean, the roadbed, the ties and the rails.

Mr. TREAT. Yes, and including one bridge that crossed the Deseado, if that was the stream. I think it was.

The CHAIRMAN. Yes, that is the stream.

Senator HARRIS. Is your information sufficient to enable you to give an approximate idea as to what a road would cost from Greytown through those swamps and up the San Juan Valley to the lake?

The CHAIRMAN. To Conchuda.

Mr. TREAT. I could not give an estimate as to the cost of the road without the profile before me.

Senator HARRIS. I ask you if you had information sufficient. Of

course the amount of cutting and grading and all that would vary very much?

Mr. TREAT. I should say that from Greytown to Ochoa, or Conchuda, \$75,000 a mile would cover the cost of a single-track railroad.

Senator HARRIS. Were you down at Panama during that time?

Mr. TREAT. Yes.

Senator HARRIS. Were you over the Panama Railroad?

Mr. TREAT. Yes; I took an engineer with me over that road?

Senator HARRIS. What do you think would be the value of the Panama Railroad as an auxiliary to a canal down there?

Mr. TREAT. Well, a railroad would be necessary the first thing, and the value would be equal to the cost of it. A railroad would be absolutely necessary.

Senator HARRIS. Certainly.

Mr. TREAT. And the value of it would be what it would cost.

Senator HARRIS. I want to get at your idea as to what it would cost, then?

Mr. TREAT. I could not give an estimate of the cost of a road across Panama.

The CHAIRMAN. How much time did you spend in Panama?

Mr. TREAT. I have only been there once; I went over and back the last year that the work was in progress under the De Lesseps régime.

The CHAIRMAN. How long did you stay on the Isthmus?

Mr. TREAT. Three days.

The CHAIRMAN. Not long enough to form any accurate idea of the situation there in regard to canal construction or health?

Mr. TREAT. Why of course I formed an idea as to the health, and formed an idea as to the Chagres floods. I saw the flood marks on the trees and bridges, but that is all.

The CHAIRMAN. You saw the flood marks on the trees?

Mr. TREAT. Yes.

The CHAIRMAN. About how high up?

Mr. TREAT. I was told they were 40 feet above mean low water, but I did not measure any. They looked very high up; they looked as if the Chagres River would pretty near fill the whole basin of the stream at the upper part from side to side.

Senator KITTREDGE. In your estimate of \$75,000 a mile does that include more than the roadbed and the track?

Mr. TREAT. No, sir; simply the road without any equipment.

The CHAIRMAN. Then in order to have a railroad, a going concern, you must have equipment, you must have docks and terminals, must you not?

Mr. TREAT. Well, in order to use the railroad you must have docks; yes, sir.

Senator KITTREDGE. And the value of the Panama Railroad, for example, is not only the cost of the roadbed and the track, but the equipment, the docks, terminals, and everything going to make it a going concern?

Mr. TREAT. That would be true, I expect.

Senator HANNA. Is the Panama Railroad a single or double track?

Mr. TREAT. A single track, I think it was then, with a good many long sidings.

Senator HANNA. Do you know what it is now?

Mr. TREAT. No; I do not.

Senator KITTREDGE. Is not the value of the railroad dependent somewhat on its age?

Mr. TREAT. Well, not if it has been well maintained. A railroad is likely to become, of course, more valuable as it is older.

Senator KITTREDGE. I am speaking purely from a physical standpoint.

Mr. TREAT. Well, speaking from a purely physical standpoint, if it is properly maintained it becomes more valuable each year. A road-bed settles, and little additions are to be made to it constantly.

The CHAIRMAN. I will ask you one more question. I speak of the area of country lying in the arc of the circle made by starting at Greytown and running up the San Juan River into the main channel and around up to Ochoa; the flat country there, if I understood you correctly, in your opinion is formed of the same material that you dug out of that soil there and put on the top of the corduroy road and made embankments of.

Mr. TREAT. I think it is, clearly. I think that whole area, that whole flat—and it is almost perfectly flat—is formed of that same material, that same volcanic sand, with occasional streaks of mud, occasional ponds of mud, you might say, especially along the little streams. At Deseado, as I remember it, there were two or three hundred feet of it that seemed to have more mud; it would be mostly mud to a great depth.

The CHAIRMAN. Is that a good soil through which to construct railroad embankments and tracks?

Mr. TREAT. Yes; sir.

The CHAIRMAN. Is it a good soil through which to construct a canal or anything which requires embankments to retain water.

Mr. TREAT. Yes; it is a soil that holds its place when it is put in place.

The CHAIRMAN. That is what I wanted to know; it is a soil that holds its place even under the torrential rains that fall in that country.

Mr. TREAT. Yes.

Senator HANNA. You have testified that you are a railroad engineer. Were you ever in any way connected with any of the commissions of the United States Government in explorations and surveys in the Isthmus?

Mr. TREAT. I am not an engineer. I am a railroad contractor, not an engineer.

Senator HANNA. You were never connected with any of the commissions appointed by the United States Government to make surveys.

Mr. TREAT. No, sir.

Senator HANNA. So that your explorations out there were simply from the standpoint of a contractor?

Mr. TREAT. Wholly.

Senator HANNA. Have you ever had any experience in the construction of dams or canals, deep foundations, and work of that kind?

Mr. TREAT. I have had some experience, but not with pneumatic work; I have had experience with under-water foundations and small dams, but not large dams.

Senator HANNA. You say that your estimate of cost of construction of a railroad from Greytown to the lake would be about \$75,000 a mile simply for the roadbed without any equipment, the station houses, or anything of that kind that would go to complete a railroad in operation?

Mr. TREAT. Yes, sir.

Senator HANNA. You say it is necessary to have a railroad preliminary to the construction of the canal. Of course you would have to build a railroad from the west end of the lake to the Pacific coast?

Mr. TREAT. Yes.

Senator HANNA. What is your idea about the cost of construction of that part?

Mr. TREAT. That construction would be very easy. A man could load a ship with tools and supplies, a couple of lighters, a light-draft tug, and discharge at once at the mouth of the Rio Grande, build out a little pier to commence with, so that the construction of the railroad could be commenced at once from the Brito end, but as to the amount of excavation and embankment on it, I do not know.

Senator HANNA. What is the topography of the country?

Mr. TREAT. It is not very rough.

Senator HANNA. Would it be more expensive, as far as excavation and construction of embankment are concerned, than the eastern end?

Mr. TREAT. No, sir; it would be surely less.

Senator HANNA. Now, speaking about the Panama Railroad, you say you do not know what would be a fair value for that property?

Senator HARRIS, when was the Panama Railroad constructed?

Senator HARRIS. From 1852 to 1855, I think.

Senator HANNA. With a railroad built across the Isthmus fifty years ago, maintained and operated from that time to the present time, a great many additions would be made necessarily to the cost of construction, side tracks, and strengthening the embankments and everything that would go to perfect a roadbed. Would you think from your observations across the Isthmus of Panama that it would cost more or less than at Nicaragua, from your observations?

Mr. TREAT. I should think it would cost more.

Senator HANNA. About how much more?

Mr. TREAT. I could not estimate.

Senator HANNA. Considerably more, or only a little more? It is all estimate of course. I know you are simply estimating.

Mr. TREAT. Well, it would cost considerably more, I should think.

Senator HANNA. Now, then, a railroad constructed for business, as that has been, and doing a heavy traffic, making it necessary to have expensive terminals, storehouses and station house, telegraph lines, and all that sort of thing, if in the construction of those terminals at Colon and Panama several million dollars had been expended you would think that would be not a large increase in addition to the simple physical construction of the roadbed and the laying of the track?

Mr. TREAT. Well, it is hard to know how to answer that question.

Senator HANNA. I don't know that I put it very clearly. Suppose the Nicaragua route, which you estimate to be built for \$75,000 a mile, which merely covers the cost of embankment, which is the rails and ties, and the embankment, without the equipment, so that construction trains could be operated—doing the same construction on the Panama route, would you think \$100,000 a mile, more or less, would be a fair estimate?

Mr. TREAT. Well, I should think, if I answered that in my own way, that a railroad built for commercial purposes, no matter how many docks, wharves, and warehouses it has, would be less valuable for construction purposes than a railroad built for construction purposes. That is, a railroad built across Panama or across Nicaragua

with express reference to construction of the canal, which might cost much less than a commercial railroad, would be worth more for construction purposes for the canal than a railroad that had been built for fifty years and maintained at a great cost, as the Panama road is now.

Senator HANNA. Well, but the railroad in Panama is already there. I am trying to arrive at some estimate of comparative values of a railroad built simply for construction purposes and of a railroad that has been there for fifty years and operated, as to the intrinsic value of property as it exists. If a railroad would cost \$100,000 a mile across the Panama route for commercial purposes, for operation and business, and the expenditure of several million dollars, two or three or four million dollars had been necessary for terminals on a railroad 50 miles long, that would add considerably to the cost; so that in comparing the estimates of a railroad built like that, with terminals like that, as against a railroad built for construction, canal construction purposes only, the difference in the cost would be very great.

Mr. TREAT. The difference in the cost would be very great, but the difference in the value for construction purposes might not be anything.

Senator HANNA. During your three days on the Isthmus of Panama were you examining the route with reference to the canal or simply the railroad?

Mr. TREAT. Simply the canal, I had no interest in the railroad; and it was as a matter of general interest in the canal. I think it was the last year that the work under the old De Lesseps Company was being done that I was there. I looked over the tools and the material that was on hand considerably, having in view the possibility of buying some of that for use up in Nicaragua in case I should ever get a contract there.

Senator HANNA. Did you find anything there that would be of use to you?

Mr. TREAT. I found nothing there that I thought would be of any value to take up to Nicaragua, except a lot of small dump cars. It was not suited for the use of American contractors, most of it. There were a lot of small dump cars, many thousands of them.

Senator HANNA. I don't think I care to ask you anything more.

The CHAIRMAN. At the close of Mr. Morison's statement the other day Senator Kittredge asked him this question:

What do you say about ships using the Nicaragua Canal after dark?

Mr. MORISON. It can be done. It is a very bad climate, but it can be done. My own belief is that large ships will not run at night, but the small ones will.

What is your experience about the climate there at night in Nicaragua?

Mr. TREAT. As far as the climate is concerned, ships would run as well there as in any country in the world at night. Ships would go at full speed in the lake any way, and I should think they would go at nearly full speed in some of the reaches of the San Juan River.

Senator HANNA. Would they go at full speed in the channel in the lake, 150 feet wide?

Mr. TREAT. No, sir; but over a part of the lake for 40 miles or more they would go at full speed, just as fast as they would in the open ocean.

Senator HARRIS. Are the nights foggy down about Greytown—unusually dark?

Mr. TREAT. No, sir; very seldom, if ever, foggy. I never saw a foggy night there.

Senator HANNA. During the heavy rains at night it would be cloudy and dark, would it not?

Mr. TREAT. The rains are generally in the daytime.

Senator HANNA. It does not rain at night?

Mr. TREAT. Not much, and the rains decrease rapidly as one goes from the coast west, very rapidly. The rains are tremendous just at Greytown.

Senator HANNA. Have you ever had any experience in operating ships?

Mr. TREAT. No. I have been on ships a good deal.

Senator KITTREDGE. Do you think a steamship would go through the Nicaragua and the Panama canals under her own power?

Mr. TREAT. Oh, certainly; I think so.

Senator KITTREDGE. And would not have to use tugs?

Mr. TREAT. I don't know about the Panama Canal, but I do not think they would use tugs on the Nicaraguan Canal.

Senator KITTREDGE. Where would the difference come in between the Panama and the Nicaragua in that respect?

Mr. TREAT. I don't know; I have never seen a map or profile of the present location of the Panama Canal. I know nothing about it, but I see no reason why steamers should not go through the Nicaraguan Canal under their own power, and as I say, for a part of the length, certainly in the lake and in some parts of the river, go at full speed, or nearly at full speed.

Senator KITTREDGE. Suppose it would be necessary to have tugs to take a steamship through the canal proper, would a steamship get under its own power to go across that lake?

Mr. TREAT. I should think so.

Senator KITTREDGE. For a distance of 40 miles?

Mr. TREAT. I should think so if it was going right on through.

Senator HANNA. You say you think it would be an easy matter for a steam vessel, by her own power, to operate through the Nicaragua and not through the Panama?

Mr. TREAT. No, sir; I did not say that.

Senator HANNA. Have you seen the profiles of the Panama and the Nicaragua canals?

Mr. TREAT. I have seen the profile of the Nicaragua.

Senator HANNA. What do you know about the curvatures in the Nicaragua as compared with Panama?

Mr. TREAT. As compared with Panama I do not know much. I believe in Nicaragua there is no radius under 4,000 feet.

The committee then (at 11.15 o'clock a. m.) took a recess until 3 p. m.

STATEMENT

OF

COMMANDER LUCIEN YOUNG

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA

ISTHMIAN CANAL.

WASHINGTON, D. C., *Wednesday, February 5, 1902.*

The subcommittee met at 3 o'clock p. m. February 5, 1902.

Present: Senator Morgan, chairman. Also Senators Hanna, Hawley, and Kittredge, members of the committee.

Commander LUCIAN YOUNG appeared and was duly sworn by the chairman.

STATEMENT OF COMMANDER YOUNG.

Senator HAWLEY. Commander, I am told that I am to ask you questions. I want to know, in the first place, when you first visited the Chagres River?

Mr. YOUNG. Senator, will you permit me to say this, that I have never at any time been ordered, in an official capacity, to inspect or visit the canal and that it is quite a number of years since I went over in company with experts, and, not having my notes and memoranda taken at that time, and which are now stowed away in my baggage, I would request that you permit me to talk in general terms of the personal opinion that I formed and of the information that I received at that time; also, that I am not able to state absolutely the facts as they occurred at that time.

Senator HAWLEY. You were informally there?

Mr. YOUNG. Informally.

Senator HAWLEY. You were never detailed to go there, I understand you?

Mr. YOUNG. I was informally there, and made my trips across the Isthmus in search of information for personal knowledge, which I have attempted to do wherever I have been ordered at any time by our Government.

When my visits across there commenced exactly I am sorry to say I can not tell, but it was in the early eighties, at the height of the work that was being performed then by the French Government under De Lesseps. They continued under various visits I made at different times on board of men-of-war that were stationed temporarily there in Panama or in Aspinwall.

I was invited to make an inspection of the works that were then being performed by the French company in the digging of a canal, and I made a thorough tour, which took two or three days, through the entire projected route. There were in the party, as far as I can recollect, two French engineers, one English, and I think a German engineer, who had been sent out there for the purpose of investigating the work that was being done. There had been then about 40 to 50 feet cut in what is known as the Culebra cut.

Senator HAWLEY. Where is that?

Mr. YOUNG. It is right in the middle, just halfway; that is the highest elevation of the Isthmus. We went all down through the Chagres River on board the dredgers, and I heard and asked questions as to the work that was being done. I made no soundings, I made no technical examination—I am not an engineer—but I took memoranda, notes of the conversation that took place, and I believed those statements made at that time to be true.

Senator KITTREDGE. Who made these statements?

Mr. YOUNG. These engineers, of whom I was a guest. I don't remember their names; it is too long ago. There were two Frenchmen, one Englishman, and I think one German engineer, and I think an American naval doctor in the party.

Senator KITTREDGE. When was this?

Mr. YOUNG. In the eighties, I think about 1885 or 1886, when the canal under the French jurisdiction was at its height.

I found, on going over the line, some two or three hundred dirt excavators that I was informed they had purchased without ever having been tried or tested, and they were ditched alongside as absolute failures. I saw somewhere in the neighborhood of five or six locomotives that had fallen over the side of the railroad that had never been taken out. The entrance to the canal on the Panama side was a little distance above Panama. The bay of Panama is a very long bay, runs up quite a number of miles, and, referring to this map, here is Panama, and there is a little branch that comes in here, and there was the canal.

The CHAIRMAN. It was on the Rio Grande River, was it not?

Mr. YOUNG. I have forgotten the name. It was a little river just above Panama. I saw dirt being thrown into the harbor there from excavations that were hauled down. I also saw the dredges removing that same dirt after it had been deposited in the barges and hauled out somewhere else.

According to my recollection, the Culebra cut is a summit some 328 feet above the sea level, and in order to cut down to a tide-water level it would cost not only the transportation of that dirt to the harbor of Panama, because from the nature of the topography of the country surrounding it could not be deposited there, but it would necessitate the cost of a second handling of that dirt to deposit it out where it would not interfere with navigation. Next, the Chagres River, which rises up in the mountains near a little village, I believe called San Blas, makes a detour down to the southward and westward, and a sharp bend to the northward and westward, running down through a range of mountains that project up close to the bed of that river, so close that it makes it a channel, I would say about 300 to 500 feet wide, the surrounding country being made up of sugar lumps or loafs, breaking the entire country roundabout.

The line of the projection of the canal went through and crossed the Chagres River twice from Matuchin, I think, is the name of the town. My recollection is from the reports of these engineers that Matuchin is about 90 feet above the sea level, showing, then, that the Chagres River is a torrential river that flows down under certain conditions with a very strong force, especially in the rainy season. In order to control this body of water that has been known, it is so reported, to rise as high as 52 feet in two hours, they had to dig a tunnel, which I went through, in the side of one of the projecting spurs in the moun-

tains to divert this river from the canal, and they had built a dam that cost, so they told me, in the neighborhood of \$5,000,000, to throw this water to the right or southward of Aspinwall, in order to utilize the bed of the Chagres River for the canal.

Senator HANNA. Permit me to ask a question right there. You say that river has been known to rise 52 feet in two hours. Is that a matter of record?

Mr. YOUNG. Yes; that is what I am told.

Senator HANNA. Where can I find that record?

Mr. YOUNG. I do not know. That was given to me by these engineers. I am simply repeating as near as I can remember the statements made by these engineers.

Senator HANNA. What engineers?

Mr. YOUNG. Two French, one English, and one German. Their names I can not recall.

Senator HANNA. When was this?

Mr. YOUNG. That was in the eighties.

Senator HANNA. Were they engineers employed by the Panama Company?

Mr. YOUNG. No, sir; they were engineers sent out there to make an inspection and make a report on it, and I was invited to go with them. They did not belong to the company at all.

Senator HANNA. By whom were they employed?

Mr. YOUNG. That I do not know. I would know if I could find my memoranda.

Senator HANNA. This is all hearsay testimony, then?

Mr. YOUNG. I was present on the ground and witnessed what they told me.

Senator HANNA. That is what I wanted to know.

Mr. YOUNG. And what I state from my own opinion is based entirely, as I say, on what these gentlemen pointed out, this and that. I made no survey myself; I made no soundings; I took no rise or fall of the water, or of the tide or rainfall. It was simply what they had pointed out to me in their conversation and talk.

Senator KITTREDGE. I think you stated earlier in your examination that you are not an engineer?

Mr. YOUNG. I am not an engineer; I am a naval officer.

The CHAIRMAN. I want to ask you a question, if you please. You speak about going through a tunnel.

Mr. YOUNG. Yes; there was a tunnel about halfway between Matuchin and Aspinwall, and they attempted to divert the overflow of water through this tunnel and to dam up the river; that is my recollection; and that tunnel was inadequate for the overflow of water which occurred immediately afterwards, of which I saw the effects in another inspection I made of the canal.

The CHAIRMAN. I want to ask you about the dimensions of that tunnel as near as you can give them.

Mr. YOUNG. As near as I can remember I would say about the size of the end of this room. That would be about 25 or 30 feet high and about 20 feet in width. It is not that much. I would say about 20 feet high.

The CHAIRMAN. Was that tunnel cut through rock?

Mr. YOUNG. Cut through rock.

The CHAIRMAN. How long was it?

Mr. YOUNG. It was not more than 50 to 60 yards.

The CHAIRMAN. And the object of that was to carry the river through there?

Mr. YOUNG. To carry the river through there.

The CHAIRMAN. Divert it from the bed?

Mr. YOUNG. So they could utilize the bed.

The CHAIRMAN. Divert it on the right bank?

Mr. YOUNG. Yes; and relieve the pressure on the dam.

Senator HANNA. You say that tunnel cost \$5,000,000?

Mr. YOUNG. My recollection is the dam cost five million, and the first freshet that came afterwards washed the dam entirely away—there was not a vestige of it left, and the river took its original bed. I have been across the Isthmus of Panama and down through the canal, I suppose, about seven or eight times, all told.

Senator HANNA. Since this first visit?

Mr. YOUNG. Yes.

The CHAIRMAN. How late were you there the last time?

Mr. YOUNG. I think it was in 1890 or 1891. It was when the *Boston* was on her way to the Sandwich Islands. As I have said, I can not speak definitely as to dates. I only wish to talk generally.

Senator KITTREDGE. Are you connected with the Navy Department?

Mr. YOUNG. Yes, I am in the Navy; but, Senator, I have never been there in any official capacity, with the exception of the last detail that I had there, when I was ordered to serve at the western approaches of the Nicaragua canal. I have nothing to do with it or any interest in it in any shape or manner; I have never had a share of stock in any company; I have never expressed my opinion as to the preference for any route, and I have never had the slightest interest in anything connected with it in any shape or form.

Senator HAWLEY. You are a lieutenant-commander now?

Mr. YOUNG. I am a commander now. I have been over the Panama route, I suppose, seven or eight times, all told.

Senator HANNA. On the railroad, you mean?

Mr. YOUNG. No, sir; I have been down in and walked across. I have been in the bottom of the Culebra cut, and I have been down the Chagres River, to which subject I was just coming when I was interrupted.

I went down with these engineers. I went on board the big dredges, which were then known as the largest dredges in the world, the Slavin dredges, I think, was the name of them. I saw them dredging in the bottom of the Chagres River, and the nature of the soil that came up was more of silt than it was hard. They were blasting in several places, and each one of us made some inquiry as to what was the nature of the substrata under the earth and stone, and, to my surprise, they told me that it was a solid conglomeration of lava, porous; that you could put down a stick of dynamite, or a cup of nitroglycerin, or any other explosive, and it would fizz through. It would not do its work; it would only produce a little hole. In other words, it was absolutely solid, and that was 8 feet below the surface of the water. In order to get a 35-foot or 28-foot depth of channel it would be absolutely necessary to cofferdam and saw this out, which is very expensive, as they realized and so stated to me. Even the people of the dredge thought it would be an absolute impossibility for them to ever take that out for even one-third of the estimate that was made to construct

that canal from the time they took the Chagres River bed until they come down to its end.

Senator HANNA. What part of the canal was this condition, whereabouts—how far from Greytown did they find this condition?

Mr. YOUNG. Greytown is on the Nicaragua.

Senator HANNA. I mean Colon.

Mr. YOUNG. The mouth of the Chagres River is about 8 miles above Aspinwall.

Senator HANNA. I want to locate —

Mr. YOUNG. It is swampy on each side of it, and swampy with silt and mangrove that only runs down to this conglomerate mass of lava.

Senator HANNA. I want to get whereabouts in the canal this condition exists that you are describing now.

Mr. YOUNG. All the way from the time it gets through its torrential flow until it gets to be a steady river or creek, or whatever it may be called, down to the Caribbean Sea, which is a distance, I imagine—I am only guessing at it—of, I would say, from 10 to 15 miles.

Senator HANNA. This lava foundation pervades the whole district?

Mr. YOUNG. Pervades the whole entire district. It is simply a conglomerate mass of porous lava. They brought me out several pieces of it and showed it to me, and it was like honeycomb. It was a solid mass. It is not a ledge of rock at all; and in order to remove it, it must be cofferdammed. Now, that is what the engineers told me.

Senator HANNA. Are they removing any of that now?

Mr. YOUNG. No; they were only dredging dirt from the top of these rocks; they never went any deeper; they went down to this lava. The dredges simply dredged to this solid mass of lava when I saw them, and they went no farther. They tried to blast it on several occasions, and when they blasted it it simply fizzed up, as I say, and they showed me pieces that came up not much larger than my hand—that came from a little hole; and they showed me the sounding, and I saw them make the sounding, and I took the lead in my hand myself and sounded to see if it was a solid bottom, and I found a rocky bottom—that is, a hard bottom.

Senator HAWLEY. If any of you gentlemen care to ask any more questions, do so.

Mr. YOUNG. I think that is about all that I can remember without some suggestions.

Senator HANNA. When you went out on this occasion with these engineers, whom were you representing?

Mr. YOUNG. No one at all; I was their guest.

Senator HANNA. You went as a guest?

Mr. YOUNG. Yes.

Senator HANNA. I think it is important for us to have the names of those engineers.

Mr. YOUNG. It is impossible for me to give them without finding my memoranda.

Senator HANNA. Can you get them and furnish them to the committee?

Mr. YOUNG. No, sir; I can not, because it is away back in the eighties, and I made no particular point of it. It was my own personal desire to know what was there and also to go through it and see it, and also that I was desirous of seeing what was being done in order to improve my knowledge in the profession I was following.

Senator HANNA. I understand that. In whose employ were those engineers?

Mr. YOUNG. I am inclined to think they were employed by their own governments.

Senator HANNA. Well, by whose government?

Mr. YOUNG. The French, English, and German.

Senator HANNA. Governments?

Mr. YOUNG. Yes.

Senator HANNA. I never heard of anything of that kind. Have you heard of any commission being sent out by the governments of Europe, Senator Morgan?

Mr. YOUNG. These were not a commission. They were officers sent out like we have military and naval attachés here.

Senator HANNA. Do you remember the year, Senator Morgan, that the new Panama company sent out experts before they decided to take hold of the project?

Mr. YOUNG. Oh, excuse me for interrupting you, but one of the engineers who went with us was of the canal company.

Senator HANNA. I understood that the new company when they considered the proposition to put in the \$13,000,000, before they would go any further they investigated the subject by calling together what was called the Comité Technique.

The CHAIRMAN. You are referring to a previous commission known as a Commission d'Etudes?

Senator KITTREDGE. I think you have in mind the commission of which General Ebert was a member?

Senator HANNA. Yes; what year was that?

The CHAIRMAN. I can give you the date from the Isthmian Canal report here.

Senator KITTREDGE. There was General Ebert from this country.

Senator HANNA. Yes; and an engineer from France, and one from Holland, one from England, and one from the United States. Was it that commission you were with, Commander?

Mr. YOUNG. I do not know. I know it was a number of engineers who were sent out there to investigate and report on this canal, and I went with them.

Sanator HAWLEY. Did they ever publish a report?

Mr. YOUNG. That I don't know.

Senator HANNA. This was in '89?

Mr. YOUNG. No, sir; it was somewhere in the eighties. My impression is it was about 1886. I have been there since, understand, time and time again, but the time I made a study of it for my own personal benefit I think was in 1886, and I got more information from those gentlemen than I ever had before or since; yet since, on my subsequent trips across, I have found corroboration of the statements they made then, that it is absolutely impossible to do it under the estimate they have made; and when we got back to Panama in the club at a little dinner together, that was the universal expression of each of them, and the main point they made was this: Where shall they deliver the dirt from the Culebra Cut, which is the highest ridge and nearly 20 miles from Panama, and some distance, about 41 or 42 miles across the length of the canal—where will they deliver this dirt after they take the surface off and fill up the ravines between the mountains? It would cost less to haul it down to the seacoast and double handle it than it would to

pile it up to be spread about by these tremendous rains; and when it rains down there in the Isthmus, understand, gentlemen, it does not rain—it pours. It is a cloud-burst; it will come down so thick that you can not see as far as across this table, and it will rain in the neighborhood of 5 or 6 inches in a day. They do not know where to put this dirt.

The second question is, How can they get rid of this porous lava at the bottom of the Chagres River or when they get down to the level? Another thing is, the average tide level on the Panama side is about 19 feet and on the Aspinwall side it is about 5 feet. They have got to lock and dam to get through there and to control that body of water.

Now, the suggestion was made about elevating the canal up to the height of the supplying of fresh water, which was about 85 or 90 feet, up near where the Chagres River makes its turn, and then you have got to go about 60 feet above that, making a little over 125 or 130 feet to build it level and get a water supply. I went across the Isthmus at one time in the rainy season, which commences in the early part of May and lasts until the latter part of December, and the dry season from the latter part of December to the latter part of March, and during the dry season when I went across I do not think there was as much water in that Chagres River as there is in the Eastern Branch here; yet I have heard a great number of people say they have tested it—and I can not confute their statement—and that they have found as high as thirty-five or forty millions of gallons a day that they can run into a reservoir, and I must say that I did not see where it came from. There are no springs that I have ever seen, and I looked for them particularly; I saw no springs along that route, and I saw nothing that would form a water supply during the dry season, that would give any substantial reservoir supply for the handling or transmission of vessels through any canal they can make.

Senator HANNA. You are not a canal expert nor an engineer?

Mr. YOUNG. No, sir.

Senator HANNA. Just a plain North American sailor?

Mr. YOUNG. A plain North American sailor. I have just given my recollection of the statements of those men and the impressions I obtained in search for my own personal information. Another thing, about the winds. It is in the calm belt. There are sometimes very severe northers in Aspinwall. The water is shoal coming up into the harbor. There is no immediate harbor on this side, and you will have to make an artificial harbor.

Senator HANNA. That is true of any other place in the Isthmus.

Mr. YOUNG. Certainly it is.

Senator HANNA. With reference to still water in Panama Bay; there has been some reference to that. Is'nt it true, Commander, that any sailing vessel that would need the wind to get out of Panama Bay would have to be towed through the canal, no matter which canal it is?

Mr. YOUNG. Certainly.

Senator HANNA. So it would only be a question of the extra cost of towing out 100 miles?

Mr. YOUNG. No, sir; because the Bay of Panama is about 120 miles deep.

Senator HANNA. They have to tow out of that?

Mr. YOUNG. Yes.

Senator HANNA. It would be only the question of a few extra.

dollars or the extra cost, whatever it may be, if the tug was taken through the canal, to take them out, say, 150 miles farther.

Mr. YOUNG. It would be only a very small cost.

Senator HANNA. So the fact of there being still water would not be any detriment to sailing vessels?

Mr. YOUNG. No, sir.

Senator HANNA. Do you believe any steamer, with the ordinary draft of water, could go through either of these canals without the aid of tugs?

Mr. YOUNG. Steamers could under their own power.

Senator HANNA. Would you want to steer one in there within 6 inches of the bottom, a steamer 500 feet long, with the narrow turns they have?

Mr. YOUNG. Of course she would have to have a trolley of some kind to guide her.

Senator HANNA. She should have a tug.

Mr. YOUNG. Yes; necessarily should have, and for why? Because the screw in turning would disturb the bottom and make such a disturbance as to endanger the passage.

Senator HANNA. Not only that, but you could not get steerageway on that you could depend on by the action of the screw, to use a screw with her bottom as close as that to the bed of the canal. I am a vessel man, you know.

Mr. YOUNG. Yes. I would not want to have a steamer of my own do that; no, sir. But there was one thing, however, Senator, that I was thinking of when I came up here. I did not dream of coming up here until Senator Hawley spoke to me about it. I have been the captain of the port in Habana for the last three years, and as such I have been supervisor of the docking of vessels there, even with the Spanish dock, you know, and so forth, and I know the cost of docking a vessel in the Tropics down there. It was 50 cents a ton for the first day and 25 cents for the lay off days. Now, you take a 6,000-ton ship, and it was \$3,000, you see, for the first day for docking her, and \$1,500 for every other day she lays in her dock. The marine growth in the Tropics, particularly on iron vessels that are built to-day in the Tropics, is something enormous. Fresh water is absolute poison to all that marine growth. If you can have a fresh-water reservoir in which the vessel can transfer certain freight going in one direction and certain freight going in another direction and loading up at the same time, she is saving that docking privilege, because the fresh water cleans her bottom entirely.

Now, take the sum of from six to eight thousand dollars that it will cost to dock a vessel and to clean her bottom; it can not cost more than \$1,000 or \$1,500 to take her through a fresh-water canal, or lying in a lake. Take the difference between those sums and that is a big saving, naturally, to the steamship companies. I had a tug there in Habana that I had in the water only four months. I had a marine growth that thick on her bottom. [Indicating about 1½ inches.] I had to dock her and clean it off. In the man-of-war that I commanded during the war, after the war was over—I had not been in a dock—I was ordered from Santiago to proceed to Key West. I could not make 4½ knots under full power.

Senator HANNA. What ship is that?

Mr. YOUNG. The *Hist*. I went into Cienfuegos in a norther, and

got in and sent divers down to scrape her bottom, and afterwards I made 13 knots. So you can have some idea of what this marine growth is.

Senator HANNA. Oh, I know it is heavy.

Mr. YOUNG. So, having a fresh-water place where a vessel can lay would be a big saving. Now, I have no preference in the canal. I was requested by Senator Hawley to come and tell about my trips there.

Senator HAWLEY. I don't think we want to detain you any longer. Is there anything more, gentlemen?

The CHAIRMAN. I want to ask you about the prevailing winds off the coast of Panama?

Mr. YOUNG. Panama is in the calm belt and there are variable winds.

The CHAIRMAN. How far out into the ocean does that calm belt extend?

Mr. YOUNG. It will extend all the way to the ocean.

The CHAIRMAN. Into the ocean?

Mr. YOUNG. It is about 120 miles from Panama to the Pacific Ocean.

The CHAIRMAN. When you get out that distance does the calm still continue outside?

Mr. YOUNG. It continues to the north and to the south, according to the seasons of the year. It varies backward and forward. The calm belt runs about 10° north of the equator to about 10° south of the equator—that is the lowest—and then it will run up to about 20° in the winter time.

The CHAIRMAN. How long is that calm maintained; how long does it continue to be calm during the year?

Mr. YOUNG. It continues altogether on an average of six months in the year. It is equally divided.

The CHAIRMAN. Can sailing ships get through there?

Mr. YOUNG. Sometimes it will take a sailing ship a number of days to get outside of Panama Bay. I have seen Panama Harbor without a breath of air for days.

The CHAIRMAN. How is it at Colon? What kind of a harbor is that?

Mr. YOUNG. There is really no harbor at all. There is a kind of curved roadstead and runs up shallow, and as a rule we anchor outside some little distance, perhaps 3 or 4 miles from the town.

The CHAIRMAN. You mean with a man-of-war?

Mr. YOUNG. Yes.

The CHAIRMAN. Why don't you go in?

Mr. YOUNG. I may be wrong, but I don't think there is more than 18 or 19 feet of water in the harbor, and if it gets anyway rough at all, then of course you will bump on the ground; and another reason we do not go in is on account of the health. The most unhealthy place on earth is the Isthmus of Panama. I had yellow fever myself in Panama, and I have seen them dying there by the wholesale, and so far as yellow fever is concerned, I would rather be in Habana than in Panama.

Senator ———. You have got rid of that there pretty much, haven't you?

Mr. YOUNG. Yes. We have not had a case since last January.

The CHAIRMAN. Have you ever been through a storm with the northers off Colon, there?

Mr. YOUNG. I was one time in a norther off Colon, yes, sir; and not only was I in it, but I had a very unpleasant experience. We did not

permit any of the officers or men to remain there over night, and I was rather late and missed my boat, and I hired a merchant's boat to take me off, and the norther was so strong that the boat could not reach the ship, and we drifted over to the mouth of the Chagres River, about 8 miles above, and had to stay there all night until the next morning before I got on board.

The CHAIRMAN. Well, when a norther comes there or a heavy sea from the northeast into the Bay of Colon, can ships remain at anchor there?

Mr. YOUNG. Oh, yes, they can remain there. It is a very good holding ground, but if they drift, and drift in nearer shore, my recollection is it is a coral bottom and it is rather dangerous. No ship would anchor out close on to shore on that account.

The CHAIRMAN. Anchor out a mile or such a matter as that from shore?

Mr. YOUNG. About 3 miles.

The CHAIRMAN. So that you would not call it a harbor at all?

Mr. YOUNG. I would not call it a harbor of refuge.

The CHAIRMAN. Not a place for a ship to seek shelter?

Mr. YOUNG. No, sir. You would have to build a harbor anywhere on this side.

Senator HAWLEY. Why do you seem to be especially afraid of coral?

Mr. YOUNG. Because it is a hard bottom. A ship can pound in mud and it won't hurt her, but if she pounds on solid rock or coral, of course it would knock a hole in her bottom.

The CHAIRMAN. Now, on the Panama side, how would you have to go from the coast proper, from the line of the land, out into Panama Bay before you would find water such as you could find anchorage in for, say, a man-of-war?

Mr. YOUNG. Oh, inside of two or three hundred yards of the entrance of where they have located the canal you have water, probably, at low tide, 25 or 30 feet in Panama; and, anyhow, they could utilize a good deal of this dirt by filling up between Panama to the southward, around where it is shoal water now, and reclaim that land. That could be done; but to get out on the other side and dispose of all this 328 feet, my recollection is, with a canal that has to be 250 feet wide at the bottom at tide level, it must be pretty near three-quarters of a mile wide on top, taking the cubic feet of dirt to be disposed of, you can see what an enormous quantity it is. That would fill up almost the entire Bay of Panama, and you would have to take it miles away from town.

Now, gentlemen, if I had my memoranda, as I stated before, it would help me out very much, because I feel somewhat embarrassed and make a statement based entirely on recollection, but what I have said is as near as I can remember it.

The subcommittee then (at 3.50 p. m.) took a recess until the next day, February 6, 1902, at 11 o'clock a. m.

STATEMENT

OF

MR. S. W. PLUME

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Thursday, February 6, 1902.*

The subcommittee met at 11.15 o'clock a. m.

Present: Senator Morgan, chairman; also Senator Kittredge, a member of the committee.

Mr. S. W. Plume appeared and was duly sworn by the chairman.

STATEMENT OF MR. S. W. PLUME.

The CHAIRMAN. What is your age and where do you reside?

Mr. PLUME. Seventy-two. I reside in New Orleans.

The CHAIRMAN. What has been your business in life?

Mr. PLUME. Building railroads, sir, and canals.

The CHAIRMAN. Where have you built railroads and canals?

Mr. PLUME. In the United States, Mexico, Cuba, Central and South America.

The CHAIRMAN. In what part of South America have you built railroads?

Mr. PLUME. In the interior of Colombia.

The CHAIRMAN. How long a road did you build there?

Mr. PLUME. It was projected 110 miles, but with the difficulties we had we only run it up about 15 miles, the climate was so bad.

The CHAIRMAN. When was that?

Mr. PLUME. In 1877 to 1879.

The CHAIRMAN. Do you know these Colombian people pretty well?

Mr. PLUME. I do.

The CHAIRMAN. What is their disposition toward the United States?

Mr. PLUME. The people of Mexico, Central and South America are very much prejudiced against the United States. They have an idea that we want to take their country from them. I told them, "You need not be afraid of that, we have all the country that we want, all the land that we want." But you can not make them believe it. They are very much prejudiced against us.

The CHAIRMAN. Did you ever do any railroad work on the Isthmus of Panama?

Mr. PLUME. Yes; I was there from 1883 to 1888. I know every inch of it.

The CHAIRMAN. What were you doing in railroad work on the Isthmus of Panama?

Mr. PLUME. Roadmaster and trackmaster of the Panama Railroad.

The CHAIRMAN. So you know the railroad thoroughly?

Mr. PLUME. I do.

The CHAIRMAN. And the country about it?

Mr. PLUME. Yes, sir.

The CHAIRMAN. Were you constantly employed while you were there?

Mr. PLUME. Yes, sir.

The CHAIRMAN. By what company were you employed?

Mr. PLUME. By the Panama Railroad Company.

Senator KITTREDGE. Was this part of the present Panama road that you built, or was it a branch?

Mr. PLUME. I was roadmaster of it, sir. It was started in 1851 and it was completed about the early part of 1855. I went down there after it was constructed, and I was roadmaster and trackmaster of it.

Senator KITTREDGE. Where did you purpose building this extension of 110 miles in length?

Mr. PLUME. Oh, this was in another part of Colombia, in the southern part of Colombia. This other road was 144 leagues up the Magdalena River. The Panama road runs straight across the Isthmus. It is 47 miles long from roundhouse to roundhouse.

Senator KITTREDGE. The road you constructed was not part of the Panama road?

Mr. PLUME. Oh, no, sir.

The CHAIRMAN. He was trackmaster on the Panama road. Who constructed the Panama Canal?

Mr. PLUME. The French company had it.

The CHAIRMAN. Who constructed the railroad?

Mr. PLUME. Well, that was by Mr. Chauncey and Mr. Aspinwall and four or five other millionaires. It cost \$5,000,000 when they first built it.

The CHAIRMAN. Who was the chief engineer in constructing it?

Mr. PLUME. Colonel Totten.

The CHAIRMAN. He was an American?

Mr. PLUME. Yes.

The CHAIRMAN. Now, I want you to begin at the Colon side of the isthmus where that railroad has its terminus, and I want you to go through to the Pacific side, and describe the different sections of country through which that road runs, and where it crosses the river, and what river it is. Just make your own statement about the character of the country with reference to railroad building and railroad maintenance.

Mr. PLUME. Yes; now, first, I have practical knowledge of all such work as that. The canal commences at the headwaters——

The CHAIRMAN. I am speaking of the railroad.

Mr. PLUME. The railroad commences at Colon and runs across through a very swampy country. When they built it they had to pile it, and after they piled it they filled it, filled in the trestle works. After you get up to Gatun, which is 7 miles from Colon, it goes over a hill down into a long swamp. There is hardly any foundation to this swamp. They put in a trestle work there and they filled this trestle work in, and it kept going down and going down and going down and they kept filling in and filling in, and now, as long as the Panama Railroad has been built, some fifty years, the embankments are only from 6 to 8 inches above the water; it keeps going down and going down.

The soil across the Isthmus at every rainy season becomes perfectly

saturated with water. At a certain distance down there is a strata of blue clay. It is very hard to dig. The best thing is to drill it. The soil above that becomes saturated and it will slide off on top of this blue clay. They built the road very cheaply; they avoided all this bad work as much as they could, and they made the road a great deal longer than it ought to be. We have one curve called the Alligator Bend, which is 3 miles around and about half a mile across it. They avoided all the heavy work and did the cheapest work. The canal runs alongside of the railroad. Sometimes it is within 300 or 400 yards, other places it is about 3 to 4 miles.

The CHAIRMAN. You have got now as far up the country as Gatun and across this swamp?.

Mr. PLUME. Yes.

The CHAIRMAN. What do you find when you cross the swamp—a river?

Mr. PLUME. No, sir; there is a river at Gatun, the Chagres River.

The CHAIRMAN. Does the railroad cross the river at Gatun?

Mr. PLUME. No, sir; it crosses the river 16 miles above Colon, at Barbacoa.

The CHAIRMAN. How far is that above Gatun?

Mr. PLUME. That is about 9 miles.

The CHAIRMAN. Now, in going from Gatun to the railroad crossing, what do you call it?

Mr. PLUME. Barbacoa bridge.

The CHAIRMAN. Is the Chagres River on the right or on the left?

Mr. PLUME. It is on the right at Barbacoa. It runs around across the railroad. We cross the Chagres at Barbacoa bridge.

The CHAIRMAN. What kind of ground is it on which the bridge stands?

Mr. PLUME. The ground is pretty good, sir, there.

The CHAIRMAN. Is that in the foothills of the mountains?

Mr. PLUME. It is the commencement of them, sir.

The CHAIRMAN. Of the foothills?

Mr. PLUME. Yes.

The CHAIRMAN. After crossing there, what kind of a country do you strike until you get up to Bohio?

Mr. PLUME. We have crossed Bohio already. We strike Bohio before we strike the Barbacoa bridge. Bohio is 13 miles from Colon and then we run up to the Barbacoa bridge. There is a little town on this side of the bridge called Tabernilla, and on the other side is Barbacoa.

The CHAIRMAN. We have now in this little journey crossed the Barbacoa?

Mr. PLUME. Yes.

The CHAIRMAN. Is that a creek?

Mr. PLUME. The river?

The CHAIRMAN. No; is there a creek there called the Barbacoa? I got those names wrong. It was Bohio I asked you about.

Mr. PLUME. Yes, sir.

The CHAIRMAN. You said you had crossed Bohio?

Mr. PLUME. We had passed Bohio when we got to Barbacoa bridge.

The CHAIRMAN. Now, what is Bohio? Is it a town?

Mr. PLUME. It is a small town.

The CHAIRMAN. Is there any stream there?

Mr. PLUME. No, sir; the Chagres River is about 3 miles off.

The CHAIRMAN. There is no little river or creek near Bohio called the Bohio Creek?

Mr. PLUME. No, sir; utterly impossible, because the mountain used to run down to the river, and the railroad used to run around this mountain, and we kept taking off this mountain the rock for ballast and for filling in the town of Colon, so that we have got back here from the river, I should judge, about 300 yards.

The CHAIRMAN. You mean the railroad track?

Mr. PLUME. Yes; we kept moving our track back this way as we took away the point of this mountain.

The CHAIRMAN. Now, that is on what I would call the left bank, then, of the Chagres?

Mr. PLUME. Yes; going up.

The CHAIRMAN. Now, between the railroad bridge and Obispo—do you know where Obispo is?

Mr. PLUME. Yes, I do; like a book.

The CHAIRMAN. What sort of a country is there through there between the railroad and Obispo?

Mr. PLUME. It is in the valley. The mountains run down in this way and go off into the valley, and the canal goes up the valley, and we run along the edge of the mountain. The road is very crooked.

The CHAIRMAN. So, from the bridge the canal runs up the valley of the Chagres River?

Mr. PLUME. Yes, sir; in the valley of this mountain.

The CHAIRMAN. How wide is that valley?

Mr. PLUME. Well, that is very hard to tell. In some places it is 6, 8, and 9 miles wide, and in other places the mountains come up pretty close, and it is not over a mile wide.

The CHAIRMAN. Now, we will go on up. We have got to Obispo.

Mr. PLUME. Yes.

The CHAIRMAN. Is there a stream going into the Chagres River at Obispo?

Mr. PLUME. I don't know of any, because it is all rock in there.

The CHAIRMAN. Is there any stream that heads up toward Culebra and comes down and empties into the Chagres at Obispo?

Mr. PLUME. The mountains keep narrowing up as you go up, and away up in the point of the mountain, away up in there, is where the Chagres takes her lead, gets her headwaters.

The CHAIRMAN. I want to know whether there is a stream that comes in at Obispo or near there?

Mr. PLUME. Oh, yes, there is; there is a little stream they call the Obispo River.

The CHAIRMAN. Does the canal line run up the Obispo River?

Mr. PLUME. It runs along by it.

The CHAIRMAN. By the Obispo River?

Mr. PLUME. Yes.

The CHAIRMAN. In the direction of Culebra Heights?

Mr. PLUME. Yes.

The CHAIRMAN. Where does the railroad run there?

Mr. PLUME. Right alongside of the canal. Our railroad is here and the canal is right there—the excavations.

The CHAIRMAN. How far away?

Mr. PLUME. Oh, it is a very short distance; not over 200 feet. One

place there I put in a switch for them. Why, it is right close up by, and it is all rock work, and it is the hardest kind of rock. It takes the very best diamond drill to go into it.

The CHAIRMAN. Now, does the railroad line keep along with the track of the canal line across Culebra and Imperador heights, or does it turn off?

Mr. PLUME. We run along here the edge of the mountains, as I told you before. They took advantage of all the work they could, and the canal is down there in the valley. It is all rock work now.

The CHAIRMAN. The point I want to get at is this: I understand that the canal keeps along the valley of the Obispo up in the direction of Culebra?

Mr. PLUME. Yes.

The CHAIRMAN. Now, does the railroad keep in that same valley, or does it turn around the point of the hill anywhere?

Mr. PLUME. No, sir; it runs right up here along the edge of the mountains, past San Pablo and past Imperador, and the next station to Imperador is Culebra.

The CHAIRMAN. Coming this way?

Mr. PLUME. Going toward Panama.

The CHAIRMAN. When you get on the crest of the Culebra and the Imperador ridge, do the canal and the railroad run close together, or are they separated?

Mr. PLUME. Oh, the canal is at least a mile off in front of Imperador, away down there in the valley.

The CHAIRMAN. And the railroad is up on the hill?

Mr. PLUME. We are along on the edge of the mountain.

The CHAIRMAN. Then the railroad and the canal do not cross the Culebra and the Imperador hills at the same point?

Mr. PLUME. No, sir; at Culebra, understand, our cut is right here and the canal route is right there.

The CHAIRMAN. Well, you say "here" and "there," but that does not mean anything.

Mr. PLUME. I was going to tell you——

The CHAIRMAN. I want to know the distance they are apart.

Mr. PLUME. They come together at Culebra.

The CHAIRMAN. Now, between Culebra and Obispo they are sometimes a mile apart?

Mr. PLUME. Oh, yes; more than that. Oh, they are away down there in the valley.

The CHAIRMAN. You can see it, but I can not, you know.

Mr. PLUME. And they keep working up this way, and we go this way, and they join there at Culebra.

The CHAIRMAN. Now, what sort of a ridge or hill or elevation is it at Culebra? What is about the height of it above the level?

Mr. PLUME. The French engineers have told me the cut is to be 147 meters deep. There are 39½ inches to a meter, or about.

The CHAIRMAN. That is something over 450 feet. It is a bluff there?

Mr. PLUME. Yes; it drops abruptly. I should think about 250 feet. Our railroad runs right around it and cross here, and the canal is across the railroad.

The CHAIRMAN. Is that Culebra hill, or Imperador hill or ridge, or whatever you choose to call it, the same hill that the canal goes around on one side and the railroad around on the other side?

Mr. PLUME. Yes, sir.

The CHAIRMAN. That is right, is it?

Mr. PLUME. Let me explain it to you. They saw that this Culebra hill, as they went down, is going to all come off, so they come back about 3 miles, and they diverge our track, and they run our track back of the mountain through the valley, so as to let them excavate this Culebra cut. And they run down about four or five miles, and they cross the canal on a big bridge at a place called Paraiso.

The CHAIRMAN. Are you familiar with the ground on both sides of that Culebra hill, on the railroad side of it and on the canal side of it?

Mr. PLUME. Yes.

The CHAIRMAN. Have you worked on it?

Mr. PLUME. I have.

The CHAIRMAN. Done a great deal of work there, or very little.

Mr. PLUME. Not a great deal. I left the railroad, and Mr. Danglier, the chief of the canal, sent for me. Said he: "I want you to go up there to Culebra and put those tracks in order; those engines are going off the track all the time, and there is something wrong there."

I went up there and I found a fearful state of affairs. The whole top of that hill, sir, is covered with boiling springs, and how under heaven they are going to take it out the Lord only knows. It is composed of a clay that is utterly impossible for a man to throw off his shovel once he gets it on. He has got to have a little scraper and shove it off. They put planks under the ties to try and keep it up and the whole thing had gone right down. Well, I fixed up switches so that their engines would go over them, and they are the worst engines I ever saw in my life. They brought out old Belgian engines there, built on a long iron frame and the machinery set onto that. If there is the least fall in any part of the track, they will go right over the track—keep going off all the time. In fact, all the machinery that was brought there was utterly useless except the American engines they brought out there from Paterson. They brought out 47.

The CHAIRMAN. Wait a moment. I want to stick right down to the ground and see the situation and condition of it. I want to know as well as I can possibly ascertain exactly what the condition of that Culebra is and the Imperador ridge.

Mr. PLUME. Yes.

The CHAIRMAN. Is it one ridge—Culebra and Imperador? Are they the same ridge?

Mr. PLUME. The same valley; yes, sir. Imperador is about 4 miles from Culebra, this way—toward the Atlantic. I was going to tell you, while I was up there—I was only there a week—

The CHAIRMAN. What I want to get at is the situation of that hill. If I understand correctly, the ridge that this canal crosses and that the railroad runs around, one side of it is a continuous ridge, part of which is called Culebra and part of which is called Imperador. Am I right about that?

Mr. PLUME. I will explain it to you. The mountain runs along here and branches off that way, runs to the Pacific. The mountain on the other side runs the other way, and Culebra is a gap in the mountain.

The CHAIRMAN. Is Imperador a gap in the mountain, too?

Mr. PLUME. No, sir; it is on the side of the mountain, and they keep in the valley.

The CHAIRMAN. Well, I can not comprehend that. In coming along the line of the canal you first come to Imperador, from Colon?

Mr. PLUME. Yes.

The CHAIRMAN. And then afterwards to Culebra?

Mr. PLUME. Yes, sir.

The CHAIRMAN. How far apart are those two?

Mr. PLUME. It is about 4 miles from Culebra to Imperador.

The CHAIRMAN. Now, is Imperador a town or village?

Mr. PLUME. Yes.

The CHAIRMAN. You spoke about the village on this side.

Mr. PLUME. Yes.

The CHAIRMAN. I am talking about the canal cut.

Mr. PLUME. The canal is down in the valley.

The CHAIRMAN. Does it have to rise out of that valley in order to cross at Culebra?

Mr. PLUME. No, sir; they have got to excavate.

The CHAIRMAN. I know that; they have to excavate the hill to get out of the valley?

Mr. PLUME. No, sir, not Imperador hill. They are down in the valley.

The CHAIRMAN. I am speaking of Culebra hill.

Mr. PLUME. Oh.

The CHAIRMAN. You have to excavate Culebra hill?

Mr. PLUME. Yes.

The CHAIRMAN. Is that the hill you speak of as being watery and full of springs?

Mr. PLUME. Yes, sir.

The CHAIRMAN. What kind of soil is it?

Mr. PLUME. It is the worst I ever saw.

The CHAIRMAN. What do you mean by the worst?

Mr. PLUME. It is a material that is going to be very expensive and very hard to handle. I will explain it to you.

The CHAIRMAN. Wait a moment. You mean hard to handle in digging, or do you mean that it is going to stay there after it is dug?

Mr. PLUME. It won't stay there; it is going to slough off.

The CHAIRMAN. Why?

Mr. PLUME. The rainy season will saturate the earth and it will all slough off.

The CHAIRMAN. Did it do so while you were there?

Mr. PLUME. Yes; we had a cut right alongside of where the canal was going to be built and it sloughed off, not only over the top of our track, but we found it was going to be so expensive to move it that I cut the track away there and laid another one. And a year or so afterwards the same thing took place and I laid another track, and where the present track is there are two underneath.

The CHAIRMAN. Could you not get those irons out?

Mr. PLUME. No, sir; it would cost more than the rail is worth to get them out.

The CHAIRMAN. Was this condition produced by a landslide?

Mr. PLUME. Yes.

The CHAIRMAN. Coming from where?

Mr. PLUME. It slips right off the side of the mountain.

The CHAIRMAN. What mountain?

Mr. PLUME. Well, I don't know as it has any name.

The CHAIRMAN. You speak about the Culebra Mountain?

Mr. PLUME. Well, that is the only mountain that runs all around.

The CHAIRMAN. I thought so.

Mr. PLUME. Before the French came there this Culebra was called the Summit. They named it Culebra.

The CHAIRMAN. That means something else. It means snakes, does it not?

Mr. PLUME. Yes. The canal had commenced to slough off before I left there. When I was there at Culebra that week, my house was up on the hill about 400 to 500 feet from the canal and I got up one morning and come out and the land had gone off and left a crack there 2 to 3 feet wide, and I did not say anything, but I knew what it was. It has sloughed off into that canal. The whole side of that mountain is going down into that canal. The farther down they go, the more it will slough. Why, our little railroad cut went off 6 feet to 1; it is perfectly flat that way.

The CHAIRMAN. Being on an elevation of 6 to 1, you say your cut went off; that is the way you express it?

Mr. PLUME. Yes.

The CHAIRMAN. Do you mean the land slid off?

Mr. PLUME. Keeps sliding off. Every rainy season, whenever it rains a little, the earth becomes saturated and it slides right off on this strata of blue clay.

The CHAIRMAN. It slides on the blue clay?

Mr. PLUME. It slides on the blue clay.

The CHAIRMAN. What kind of material is it above the blue clay that slides off?

Mr. PLUME. It is the worst kind of mud; it is like putty.

The CHAIRMAN. Do you think that that railroad will ever be able to sustain its railroad there without continual repairs?

Mr. PLUME. No, sir; and the road won't be good for anything after the canal is built.

The CHAIRMAN. I am not on that. I want to know what the work that will be required will amount to in keeping that railroad in repair?

Mr. PLUME. For the first year I was there I did nothing but wreck cars—burn up cars. It was cheaper to burn them up than it was to put them on the track again. I had a big wreck of seventeen cars at Tabernilla, right at the Barbacaoa bridge. I went to work and burned them up—threw the trucks right over the bank and run down into the Chagres River.

The CHAIRMAN. Why did you waste them in that way?

Mr. PLUME. The iron was not good for anything; it would cost more to get it than it was worth; and I went to Mr. Woods, the superintendent, and I told him, "There is no use of keeping cars on this track the condition the road is in." "What would you suggest?" said he. "Get lignum-vitæ cross-ties," said I. He was paying \$1.25 and \$1.50 for cheap ties, and I told him he had better pay the \$1.75 and get lignum-vitæ, and he did so; and he kept ordering them from Carthage and I kept putting them in until I got them all the way across.

The CHAIRMAN. Where is Carthage?

Mr. PLUME. About 250 miles from Colon.

The CHAIRMAN. Well, that is in Colombia, Carthage is.

Mr. PLUME. Yes.

The CHAIRMAN. And you got the cross-ties for that railroad from Carthage?

Mr. PLUME. Yes.

The CHAIRMAN. Lignum-vitæ?

Mr. PLUME. Yes.

The CHAIRMAN. At a cost of \$1.75 each?

Mr. PLUME. Yes; from \$1.75 to \$1.85. I got the ballast for the road out of the Chagres River. In rainy seasons the Chagres River is something fearful for the banks caving in. They cave immensely; never saw anything like it. It formed a large bar at Matuchin, and I saw I could utilize this stuff. The dirt washed off it and left the gravel there, so I put a track down into the river and I loaded my cars up and I ballasted the whole road. When I went there we used to have two trains a day, and it took two to three hours to go across to Panama. I had not been there three years before I went across in an hour and ten minutes or fifteen minutes.

The CHAIRMAN. How many miles?

Mr. PLUME. Forty-seven miles from roundhouse to roundhouse. We could go across in an hour and ten or fifteen minutes after I got the lignum vitæ ties in.

The CHAIRMAN. What about that gravel?

Mr. PLUME. I ballasted the road with it.

The CHAIRMAN. Do anything else with it?

Mr. PLUME. No, sir; just ballasted my road with it.

The CHAIRMAN. That gravel was washed down by the Chagres River?

Mr. PLUME. Yes.

The CHAIRMAN. Have you seen the Chagres when it was in flood?

Mr. PLUME. Yes.

The CHAIRMAN. Describe what sort of a stream it is when it is up.

Mr. PLUME. Well, when it is up it is a pretty lively stream. But in the dry season you can walk across it—you can jump across it; after you get up 6 miles above Gatun you can go across it without any trouble. I have gone up and down the Chagres River in 1849 and 1850 with a little bit of a canoe, and they had to unload and load the canoe all the way up after we got above Bohio to get over these bars, you know—little places.

The CHAIRMAN. How far up the Chagres River have you been above the line of the canal?

Mr. PLUME. In early years I went up as far as Las Cruces.

The CHAIRMAN. How far is that?

Mr. PLUME. Las Cruces I should think to be 35 to 40 miles from the mouth of the Chagres River.

The CHAIRMAN. How far would that be from Bohio or Obispo?

Mr. PLUME. Well, Obispo is far off from the Chagres. From Obispo it would be about 20 miles.

The CHAIRMAN. Right up the river?

Mr. PLUME. Yes.

The CHAIRMAN. Describe the country through which that river runs with reference to its stability, whether it is a strong soil or whether it is liable to wash.

Mr. PLUME. It washes all the time. Now, talking about the rainy season there, it does not commence raining, for instance, in the morning and rain all night. It will rain fifteen minutes, perhaps half an hour, but when it does rain it rains as though the whole heavens were opened, and it will clear off and the sun come out and we will have

fine weather perhaps the rest of the day. I have been up the Chagres River as far as Las Cruces. The canal company started to make a dam across the Chagres.

The CHAIRMAN. Where?

Mr. PLUME. Above Las Cruces, where the valley is narrowest away up there; to make an earth dam.

The CHAIRMAN. Yes?

Mr. PLUME. Well, you know how much an earth dam will stand?

The CHAIRMAN. I don't know anything about it, but I want you to tell me.

Mr. PLUME. Why, an earth dam won't stand anything.

The CHAIRMAN. You say they started to make a dam. Did they get it completed?

Mr. PLUME. Well, when I left there they hadn't it one-quarter completed. They were going to make a very large dam, they told me 35 feet high.

The CHAIRMAN. What became of it?

Mr. PLUME. I don't know, sir.

The CHAIRMAN. You haven't been back?

Mr. PLUME. They were running over there, taking the earth down this valley I was telling you about, Imperador and those places, and they were running it over there by trains.

The CHAIRMAN. Is that Las Cruces above Obispo?

Mr. PLUME. Oh, it is above Gorgona; it is this side of Obispo.

The CHAIRMAN. I don't know what "this side" means.

Mr. PLUME. Well, the Atlantic side.

The CHAIRMAN. Is it higher upstream or not?

Mr. PLUME. No, sir; Las Cruces is lower down the stream.

The CHAIRMAN. It is between Obispo and Colon?

Mr. PLUME. Yes.

The CHAIRMAN. How far below Obispo is it?

Mr. PLUME. Oh, it must be in the neighborhood of 10 miles.

The CHAIRMAN. What was the object of putting that dam there?

Mr. PLUME. They wanted to make a reservoir to feed the canal. If they had started the dam farther down, where the valley is wider, there might have been a little chance to get water. You understand the mountains keep coming together and they make a pocket away up in there, and this pocket commences this side of Las Cruces, so they started a dam the other side of Las Cruces.

The CHAIRMAN. You will say "this side." I wish you would describe it.

Mr. PLUME. The Atlantic side.

The CHAIRMAN. Very good. Now, it is very important that this committee should know what is the character of the soil along the banks of the Chagres River from Obispo toward the Pacific, or rather Obispo up the stream.

Mr. PLUME. It is all mud soil, and it washes a great deal.

The CHAIRMAN. Mud soil, you say?

Mr. PLUME. Yes; nasty, dirty, clay soil that washes a great deal. It has made bars just below our Barbacoa bridge and farther down in the bed. The French engineers have always said that the Chagres never will not do to go into that canal, and they commenced before I left, about 3 miles above Colon, to diverge the Chagres River off to the eastward. We moved our track over about 200 yards, and they

came up here with a dredge to our tracks and built a bridge, and I put our tracks back again over this bridge so that it left their dredge the other side.

The CHAIRMAN. You say 3 miles above Colon?

Mr. PLUME. About 3 miles above Colon. It is between Colon and Gatun, and Gatun is 7 miles.

The CHAIRMAN. They wanted to divert the Chagres River?

Mr. PLUME. Yes.

The CHAIRMAN. And they commenced building that diversion there then?

Mr. PLUME. Yes.

The CHAIRMAN. Dug it out?

Mr. PLUME. Excavated with excavators and a dredge, too.

The CHAIRMAN. And you had to have a railroad bridge put across that excavation?

Mr. PLUME. They put a railroad bridge on the line of our track, and I threw our track back over this bridge.

The CHAIRMAN. While they were excavating you moved your track out of the way?

Mr. PLUME. Yes.

The CHAIRMAN. And when they completed the excavation you put your track back again?

Mr. PLUME. Yes.

The CHAIRMAN. And they put the bridge there?

Mr. PLUME. They put the bridge there.

The CHAIRMAN. How many hands did you have under you as a rule—about an average?

Mr. PLUME. I had 10 men to every section, and a section run 4 to 5 miles.

The CHAIRMAN. About how many people did the Canal Company have there while you stayed there?

Mr. PLUME. Well, it was estimated that they had 10,000, but I doubt very much if 5,000 were working. The labor is of such a class that it is utterly impossible to get them to work; it is this lazy, good-for-nothing Jamaica labor, and the climate there is so bad that a man can not work.

The CHAIRMAN. Well, now, I want to get at that, and I want you now to be careful in your statements about that. Did you have any trouble in preserving the health of the party under your control—these ten men to a section?

Mr. PLUME. Oh, a great deal, sir.

The CHAIRMAN. What was the average amount of loss per annum, say, during the five or six years you were there, out of your own party, now?

Mr. PLUME. Well, every month or two I would lose a man, perhaps two men. I will explain it to you. If a man gets wet there with the rain he is sure to be sick the next morning. The dew commences to fall at 3.30 o'clock in the afternoon, and if a man gets his clothes wet with this dew and he goes to bed with his clothes on, as sure as he is born he will wake up sick the next morning. I never saw such a climate in all my life, and I have worked in the rice fields of South Carolina, and gracious only knows that is bad enough.

The CHAIRMAN. Can you give the committee some idea of the condition of health of these canal laborers during the time you were in this isthmus?

Mr. PLUME. When I went there we used to run one train—perhaps it would be a car or two box cars—in the morning out of Colon up to Monkey Hill. Our graveyard is about 5 miles from Colon, on a hill called Monkey Hill, but I had not been there a year when we were up there. Over to Panama it was the same way—bury, bury, bury running two, three, and four trains a day with dead Jamaica niggers all the time. I never saw anything like it. It did not make any difference whether they were black or white, to see the way they died there! They die like animals.

The CHAIRMAN. Of what diseases would they die, if you know anything about it?

Mr. PLUME. There are four most deadly fevers. There is the yellow fever, the pernicious fever, the putrid fever, and the typhoid fever, and the intermittent fever. If the intermittent runs long enough it will turn into typhoid or those other bad fevers. A man will only last three or four days, unless they have pretty quick and pretty severe treatment.

The CHAIRMAN. Did the Panama Canal Company have good shelter for its hands and good hospitals?

Mr. PLUME. Yes, there is no finer hospital on the globe than the one they have at Panama. It is on the side of the Ancon Mountain, which used to be a volcano several centuries ago, and the lava from the volcano went across Panama and out into the bay about a mile. The hospital is a splendid thing. It is said to have cost \$5,000,000, and I guess it did. Down in this valley you dig a hole about two feet deep and you come to a boiling spring, right under the mountains, and they have engines there pumping water up to this hospital. There is a man in Panama who has a concession to bury people. He opened a graveyard, I suppose 300 feet one way and 400 the other. Every grave is numbered that they may know who is buried there. In exactly one year after he opened it I drove by there, and there were 1,875 crosses in that burying ground, and that does not count the men that were in the ovens. They have ovens along the wall, a brick wall, and they bury people in there who can afford to pay for it; but there were 1,875 crosses in that burying ground, to give you a little idea of the health of the country.

The CHAIRMAN. About what year was that?

Mr. PLUME. That was in the early part of 1887. De Lesseps brought out 57 men there for engineers, chiefs of sections, and for different purposes, clerks. In three months, sir, there were only three of them left. I never saw any thing like it in my life. If a man drinks there he is just as sure to die as he is alive; it is fatal; and here is something very wonderful: I have always noticed if a Frenchman gets one of those fevers he is just as sure to die as he has a hair in his head. The doctors have told me that it is on account of their having drunk so much of this French claret in France, which is full of logwood and it has burned the linings of their stomachs, and as soon as they get a fever they die. My allowance of quinine was an ounce and it would last me three weeks. That is what affected my hearing.

The CHAIRMAN. You suffer from it yet?

Mr. PLUME. What is that?

The CHAIRMAN. You suffer from it yet?

Mr. PLUME. Oh, yes, and never will get over it. I always took medicine, kept my liver clean, and that is the way I kept on my feet;

and when I left that climate and came here a doctor worked six days and six nights on me to save my life. My brother-in-law told me that I must have a constitution of iron, and I believe I have.

Let me tell you another thing: In 1886 the Panama Canal Company had a meeting. They divided up the Panama Canal into four sections, and they gave three sections out to French contractors, and one section included in the Culebra cut they gave to a Holland contracting company, a very wealthy company. They came out there and they looked around and fussed about and they were not there three months before the whole of them left and went back to Holland.

The CHAIRMAN. How long have you resided in New Orleans?

Mr. PLUME. It has been my home for forty-two years.

The CHAIRMAN. But since you got out of South America?

Mr. PLUME. Lived here ever since.

The CHAIRMAN. In New Orleans?

Mr. PLUME. Yes, sir.

The CHAIRMAN. What business are you engaged in?

Mr. PLUME. Nothing, sir. I am living on my means.

The CHAIRMAN. You made money enough to take care of yourself?

Mr. PLUME. Yes. I have no interest in this thing, sir, but I tell you candidly I don't want to see our Government swindled in this operation. I have no choice of route at all, but I do not want to see our Government swindled in or saddled with a thing I know is worthless, and I do not think it is anything but a swindle.

The CHAIRMAN. Well, I think we will close the testimony right there.

The subcommittee then (at 12.10 p. m.) took a recess until the next day, February 7, 1902, at 10.30 a. m.

STATEMENT

OF

J. S. BRYAN

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

•
CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Tuesday, January 28, 1902.*

The subcommittee met at 11.25 a. m.

Present: Senators Morgan (chairman), Mitchell, Turner, and Foster, of Louisiana. Also Senator Kittridge, a member of the committee.

Capt. J. S. Bryan appeared and was duly sworn by the chairman.

STATEMENT OF CAPT. J. S. BRYAN.

Mr. BRYAN. Mr. Chairman, I was just telling the gentlemen before you came in about the advantage of the Nicaragua Canal over any other canal in Central America.

The CHAIRMAN. Before you go any farther, let me ask you some questions about what you know about it.

What is your age and residence?

Mr. BRYAN. I am 62 years of age, and I reside at Shady Rest, Montgomery County, Md.

The CHAIRMAN. Are you a seafaring man?

Mr. BRYAN. I was.

The CHAIRMAN. For how long?

Mr. BRYAN. Twenty-six or twenty-seven years.

The CHAIRMAN. Did you hold offices on board a ship?

Mr. BRYAN. Yes.

The CHAIRMAN. What were they?

Mr. BRYAN. I have been boatswain, second mate and mate, captain of coasters.

The CHAIRMAN. On what coast?

Mr. BRYAN. On the Atlantic coast.

Mr. CHAIRMAN. On the New England coast?

Mr. BRYAN. Yes.

The CHAIRMAN. While aboard ship did you visit the waters of Central America?

Mr. BRYAN. Sir?

The CHAIRMAN. State whether or not you visited the Caribbean Sea.

Mr. BRYAN. Yes; many times, I sailed down the coast.

The CHAIRMAN. You mean right down the coast?

Mr. BRYAN. Yes; to Colon and Greytown and the other ports.

The CHAIRMAN. What acquaintance have you in the Bay of Colon?

Mr. BRYAN. I have a general acquaintance, and a general knowledge of the harbor and coast line generally.

The CHAIRMAN. That is what I suppose the committee want to know. What do you think of it as a safe harbor?

Mr. BRYAN. I was explaining to the members of the committee that when vessels are lying in the harbor of Colon, when a norther comes

up they have to put to sea, or make an easting offing, as we call it; they have to go to sea and ride it out unless it is a very small vessel. Passenger steamers have to haul out in a norther or they would be dashed to pieces alongside of the dock.

Senator TURNER. What happens to sailing vessels?

Mr. BRYAN. The same thing; they have to get out.

Senator TURNER. Suppose they can not get out in this norther?

Mr. BRYAN. Then they have to be towed out. But they generally know what is coming, and they prepare for it.

The CHAIRMAN. You mean when such norther is threatened and the high sea coming down?

Mr. BRYAN. A norther brings the high sea with it. The bay is so exposed that they feel the full force of the norther.

The CHAIRMAN. Then you do not consider it a safe and convenient harbor?

Mr. BRYAN. Not continually so; only when the weather is fine.

The CHAIRMAN. What do you know about the Bay of Panama?

Mr. BRYAN. Well, ships drawing 20 or 25 feet of water have to lie about 3 miles or 3½ miles offshore on account of shoal water and ground swells.

The CHAIRMAN. Why? Because the water is so shoal?

Mr. BRYAN. Yes.

The CHAIRMAN. What is the nature of the bottom?

Mr. BRYAN. Sand, coral, and shell.

The CHAIRMAN. How about the wind in the Bay of Panama?

Mr. BRYAN. There is very little wind down there; in the rainy season there are some squalls, but for about nine months it is dead calm.

The CHAIRMAN. Do you consider if we had a canal through the Panama route that this would be an inviting place for sailing ships to go in order to cross to the Pacific Ocean?

Mr. BRYAN. No, sir; decidedly not.

The CHAIRMAN. Why not?

Mr. BRYAN. Well, a sailing ship after passing through the canal on the west coast would have to be towed out 10 miles, and then she would lay in a calm belt perhaps for three or four days, or longer, before she got any wind. The difference between the latitude of Panama and at Brito is that Brito is north of the calm belt. A vessel lying at Brito could go north as far as San Francisco and Alaska at any time, because she would have plenty of offshore wind and land breeze near the coast.

And then (at 11.40) the subcommittee adjourned until 3 o'clock p. m.

WASHINGTON, D. C., *Tuesday, January 28, 1902.*

The subcommittee met at 3 o'clock p. m.

Present: The chairman and Senator Kittredge.

STATEMENT OF CAPT. J. S. BRYAN—Continued.

The CHAIRMAN. Now, do you give us this information about the Bay of Panama from your own personal observation or from hearing other people talk about it?

Mr. BRYAN. I ran between Panama and Valparaiso and intermediate ports along west coast of South America for six months, in the vessels

of the Oriental and Pacific Steamship Company. There is an island called Bogota 10 miles north of Panama. At that point there is what we call a gridiron—that is, a marine railway that runs into the water, and the vessels are hauled up and have their bottoms scraped and cleaned there every three months and painted. I was in Panama once every month during that time.

The CHAIRMAN. Have you observed the want of wind there, called the doldrums?

Mr. BRYAN. Why, certainly. Everybody who has ever been there can tell you the same thing, that there is a dead calm nearly all the time there. There is wind there sometimes, but not to depend upon.

The CHAIRMAN. Well, over on the side of the Caribbean Sea, what time of the year do the northers or the heavy winds occur?

Mr. BRYAN. Well, along about the time of the equinoctial changes, in the spring and in the fall.

The CHAIRMAN. Have you ever been in one of those northers or storms?

Mr. BRYAN. Yes; in Vera Cruz, Mexico.

The CHAIRMAN. Are they very heavy?

Mr. BRYAN. You can not stand on the deck of a vessel during one of them without holding on to something. The wind will blow you flat. It will blow you out of the rigging.

The CHAIRMAN. Have you ever crossed the peninsula between Colon and Panama?

Mr. BRYAN. Yes.

The CHAIRMAN. How did you cross; on the railroad?

Mr. BRYAN. I walked from Panama to Colon.

The CHAIRMAN. How long ago was that?

Mr. BRYAN. That was twenty years ago. I want to tell you why I walked it.

The CHAIRMAN. I do not think that is necessary, unless the Senator wants to know.

Senator KITTREDGE. No, sir.

The CHAIRMAN. Was the railroad completed at that time?

Mr. BRYAN. Yes; but they charged \$25 fare from Panama to Colon, a distance of 47½ miles.

The CHAIRMAN. And you would not pay it?

Mr. BRYAN. I would not pay it. Myself and my shipmate thought it was too much, and that is why we walked.

The CHAIRMAN. What sort of a country is it between Colon and Panama? Describe it in your own way.

Mr. BRYAN. It is swampy and hilly all the way across. Culebra Hill (or Snake Hill) is nearer to Panama than it is to Colon. The cars go around the Culebra Mountain. After you leave that it is swampy all the way into Colon, or nearly so.

The CHAIRMAN. You say the cars go around the Culebra Mountain?

Mr. BRYAN. Yes.

The CHAIRMAN. On which side?

Mr. BRYAN. On the north side of it.

The CHAIRMAN. They do not climb over the pinnacle, then?

Mr. BRYAN. Oh, no; they go around.

The CHAIRMAN. In going across there did you keep on the railroad track?

Mr. BRYAN. We walked every step of the way on the ties or sleepers.

You could not walk on either side. There was a swamp on the north side of the road and on the south side nearly all the way across from Panama to Colon.

The CHAIRMAN. So that that railroad does not cross the ridges?

Mr. BRYAN. To some extent it does; I do not remember how much.

The CHAIRMAN. It does not cross the high ridges, if I understand it?

Mr. BRYAN. Not at all. The straight line across is 28 miles and the railroad is $47\frac{1}{2}$ miles from Colon to the depot at Panama. They have followed the trend of the Chagres River, as far as they could going west, coming from the east side. I suppose the railroad crosses the Chagres River half a dozen times or more.

The CHAIRMAN. Now, I want a description of the sort of country that there is in that region—whether it is fit for use for agriculture, homesteads, and the like of that.

Mr. BRYAN. There is none at all on the Colon side. There is none in the center. It is swamps and lagoons all the way up and down north and south of the Panama line. On the west side of the slope, in back of Panama and what is called "Old Panama," south of it, the land is fairly level, and toward the southeast from Panama inland. Otherwise it is rough and hilly. The natives do not raise anything but just some pineapples and bananas. It would be impossible for a vessel to get a cargo there, from Panama, to go anywhere. There is nothing there with which to load a vessel, except in the fruit trade, and they send that across on the railroad to Colon.

The CHAIRMAN. Do you know anything about the country lying between Panama and Lake Nicaragua? Have you ever passed up over that country?

Mr. BRYAN. Never overland; only on the coast.

The CHAIRMAN. Have you spent any time in Nicaragua?

Mr. BRYAN. I spent nine months there.

The CHAIRMAN. When was that?

Mr. BRYAN. That was about that time.

The CHAIRMAN. What were you doing there?

Mr. BRYAN. I was on the Pacific side, sailing from Panama to Callao and other ports along the coast of Peru on the Oriental and Pacific Mail Steamship Company's vessel as quartermaster, and was there seven months. Then I went up to Nicaragua and went across from San Juan del Sur, on that side, to Virgen Bay, on Lake Nicaragua, and there I got a berth on one of the steamboats.

The CHAIRMAN. By "on that side" you mean the west side?

Mr. BRYAN. On the west side; yes.

The CHAIRMAN. And in what capacity did you say you were there?

Mr. BRYAN. As quartermaster and mate of the boat. We would go to Granada, San Carlos, and Ometapa, a little island in the lake.

The CHAIRMAN. In Lake Nicaragua?

Mr. BRYAN. Yes. Then we would go down the river to Greytown. The steamboat on which I was could not go down the river all the time, but only in the rainy season. She would go down as far as San Carlos. The lower part of the San Juan River is navigated by flatboats.

The CHAIRMAN. What do you mean by a flatboat?

Mr. BRYAN. A stern-wheel steamboat, the same as they have on the bayous and back rivers in the Southern States.

The CHAIRMAN. You mean a stern-wheel steamer?

Mr. BRYAN. Yes.

The CHAIRMAN. With a flat bottom?

Mr. BRYAN. Yes; built like a skiff.

The CHAIRMAN. You say you spent about seven months there?

Mr. BRYAN. Yes.

The CHAIRMAN. Acting as quartermaster on one of the vessels of that steamship company?

Mr. BRYAN. Yes.

The CHAIRMAN. What business was that company engaged in?

Mr. BRYAN. The carrying trade around the lake, passengers, and so on, buying up hides and things of that kind, coffee and cocoa.

The CHAIRMAN. Now, tell the committee what sort of a country that is between the lakes and Greytown?

Mr. BRYAN. Along the San Juan River the country is wooded clear down to the bank of the river, hard wood, *lignum-vitæ*, mahogany, and considerable cocoa bola, a very hard wood. I do not know the names of the rest of the trees.

The CHAIRMAN. Were you out in the country at all, away from the river?

Mr. BRYAN. Not very far; sometimes I would go out into the country a little way on Sunday, occasionally.

The CHAIRMAN. You do not know what sort of a country it would be for agriculture hereafter if it was cleared off?

Mr. BRYAN. I only know from what I heard of it.

The CHAIRMAN. You do not know from your own personal observations?

Mr. BRYAN. No, sir.

The CHAIRMAN. Is the San Juan River a large, clear river, or is it a small torrential river?

Mr. BRYAN. Well, it is not a very wide river, and it is full of curves and bends and rapids.

The CHAIRMAN. Shoals?

Mr. BRYAN. You might call them shoals, too.

The CHAIRMAN. You say it is full of rapids?

Mr. BRYAN. There are four of them altogether.

The CHAIRMAN. How about the lake? Is that a fine body of fresh water or not?

Mr. BRYAN. It is a fine body of fresh water, good for drinking purposes, cooking purposes, and every other purpose.

The CHAIRMAN. Did you use it for drinking purposes?

Mr. BRYAN. Yes; that is what we used aboard of the vessel. It is a lake of fresh water 100 miles long and 50 miles wide at its widest part.

The CHAIRMAN. Good water or not?

Mr. BRYAN. Fine water, as fine as you get anywhere; far better than any water along the coast.

The CHAIRMAN. That country between the lake and Greytown is not cleared up or cultivated?

Mr. BRYAN. No, sir.

The CHAIRMAN. I understand you that it is in virgin forest?

Mr. BRYAN. Oh, it is cleared in some spots, where they have orange groves and coffee plantations, farther back, in from the river.

The CHAIRMAN. On both sides?

Mr. BRYAN. On both sides.

The CHAIRMAN. On the Costa Rica side and on the Nicaragua side?

Mr. BRYAN. Yes.

The CHAIRMAN. Tell us about what sort of a country it is between the lakes and Brito.

Mr. BRYAN. The piece of land separating the edge of Lake Nicaragua from the Pacific Ocean is a pretty level country with a sandy soil. Across the Isthmus of San Juan del Sur, up there along from the coast, it is pretty level until you get in the center, and that is pretty hilly all the way down that way. I passed by Brito many times, but have never been there. From hearsay, from those who have been there, I hear it is a pretty good harbor.

The CHAIRMAN. You have never been at Brito?

Mr. BRYAN. No, sir, I was never ashore there. There was no settlement there except a few fishing huts. San Juan del Sur in those days was the port of entry.

The CHAIRMAN. Is that belt of country between the lake and the Pacific Ocean a fertile belt of country?

Mr. BRYAN. I think it is pretty fertile. I will show you a map here that was published back about twelve years ago, and I think it is the best that has been made yet. Perhaps you have one like this. [Producing a map.]

The CHAIRMAN. I have seen that. That was published by the old company.

Mr. BRYAN. Yes.

The CHAIRMAN. That was drawn by Mr. Menocal.

Mr. BRYAN. Yes, and he made the best survey of anyone. [Referring to the map.] Now, all this territory up here is a rich country. It is a common saying among the people who live there that it is full of silver and gold.

The CHAIRMAN. Is it fertile for coffee and sugar, and all that?

Mr. BRYAN. Oh, yes. And it is as healthy, away from the coast, as it is in Washington. There is a little malaria down about Greytown, but if a man is careful he will not get it. If he drinks too much whisky he will get sick.

The CHAIRMAN. How does the health of this region of the river, from San Carlos down to Greytown, compare with Panama?

Mr. BRYAN. Oh, it is 100 per cent better, for health and everything else. If you drink the water of the Chagres River you are sure to get sick. From the lake down to Greytown it is a running stream all the time, whereas the Chagres River is dead water, almost as black as coffee.

The CHAIRMAN. You have told us pretty nearly all you know about this, have you not?

Mr. BRYAN. Well, yes. I could suggest a good many things that I have heard.

The CHAIRMAN. I do not care about what you have heard.

Mr. BRYAN. Let me suggest that a vessel leaving Greytown will get a land breeze in the night, going up the coast.

The CHAIRMAN. Let me ask you about the winds. Are they constant?

Mr. BRYAN. Yes; there is a land breeze nearly every night.

The CHAIRMAN. Do the trades pass over there?

Mr. BRYAN. No; they stop here in the center.

The CHAIRMAN. Then what are the winds?

Mr. BRYAN. What they call a land breeze.

The CHAIRMAN. The trades stop in the center here, in the vicinity of the lake?

Mr. BRYAN. Yes; somewhere along here.

The CHAIRMAN. But they come in here all the time [indicating the point on the map] from the east?

Mr. BRYAN. The northeast trades.

The CHAIRMAN. Are they regular winds?

Mr. BRYAN. Yes; they blow for about six months of the year.

The CHAIRMAN. When they are not blowing, what winds do you get on the line of the trades—a land breeze or what?

Mr. BRYAN. Well, it is generally a calm when the trade wind is not blowing; but vessels coming down here on the Atlantic side always get a breeze in the night time off the land. [Producing a map.] Now, here is the elevation.

The CHAIRMAN. Yes; but we are not going into the engineering points to-day. From what you say I understand that you regard Nicaragua as a fertile, healthful country?

Mr. BRYAN. A salubrious country; yes, sir. Now, I have made a few memoranda, which I should like to refer to before I complete my statement.

It is a well-known fact that the inhabitants of that part of Colombia near the Panama route are always in a revolutionary state. That brings to mind the fact that if they ever do attack the Panama Canal, if it is built, and if our war ships are in Colon for the purpose of protecting our interests, then when a norther comes our war ships will have to go to sea for safety, as every other ship there will have to go to sea for safety. The inhabitants can destroy the canal, ruin the locks, and there the ships of war will be standing off 40 or 50 miles in a safe position, with their hands tied, you may say, unable to get in to offer any protection until the gale subsides.

There is another suggestion I should like to make, which is that when vessels run into fresh water it kills the marine worms which destroy the planks of vessels.

The CHAIRMAN. What length of time does it take to kill the marine worms and free a ship of barnacles?

Mr. BRYAN. About a week or two for wooden ships. It is very rarely that you are able to take the barnacles off a wooden ship, however, without knocking them off.

Thereupon (at 3 o'clock and 50 minutes p. m.) the subcommittee adjourned, subject to the call of the chairman.

STATEMENT

OF

MR. J. O. JONES

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCENIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Saturday, February 1, 1902.*

The subcommittee met at 11 o'clock a. m.

Present: Senators Morgan and Mitchell. Also Senator Kittredge, a member of the committee.

Mr. J. O. Jones appeared and was duly sworn by the chairman.

STATEMENT OF MR. J. O. JONES.

The CHAIRMAN. Your name and age, if you please.

Mr. JONES. J. O. Jones; age, 27.

The CHAIRMAN. Have you been employed upon any of these surveys for the Nicaragua Canal?

Mr. JONES. Yes; I was employed by the Nicaragua Canal Commission for eleven months.

The CHAIRMAN. That is the Commission which was headed by Admiral Walker?

Mr. JONES. Yes.

The CHAIRMAN. Consisting of what members?

Mr. JONES. Admiral Walker, Professor Haupt, and Col. Peter C. Hains, United States Army.

The CHAIRMAN. You were employed under that Commission for eleven months?

Mr. JONES. Yes.

The CHAIRMAN. Were you in Nicaragua all the time?

Mr. JONES. I was in Nicaragua for eleven months, and I was here under the same Commission for about nine months.

The CHAIRMAN. Writing up their report?

Mr. JONES. In the Washington office, working on the precise-level report.

The CHAIRMAN. What were your duties? In what way were you employed in Nicaragua?

Mr. JONES. I was on the line of precise levels from the Caribbean to the Pacific.

The CHAIRMAN. On the line of precise levels from the Atlantic to the Pacific?

Mr. JONES. Yes.

The CHAIRMAN. That was run for what purpose?

Mr. JONES. To determine the difference in elevation of the two oceans.

The CHAIRMAN. The difference in elevation of the oceans on either side?

Mr. JONES. Yes.

Senator KITTREDGE. What part did you take in the work?

Mr. JONES. I was recorder. I did not run an instrument. I am not an engineer.

The CHAIRMAN. I understand you are not an engineer. What difference in the levels of the oceans was found by that measurement?

Mr. JONES. I do not know the exact figures. They are shown in the report.

The CHAIRMAN. About how much?

Mr. JONES. It was about nine-tenths of a foot.

The CHAIRMAN. Which was the higher side?

Mr. JONES. The Atlantic.

The CHAIRMAN. The Atlantic was the higher?

Mr. JONES. Yes.

The CHAIRMAN. Heretofore it has been supposed that the Pacific was 10 feet higher. You say the Atlantic was the higher about nine-tenths of a foot?

Mr. JONES. Yes.

The CHAIRMAN. In running that level did you keep along on the previous line of the canal survey?

Mr. JONES. We followed as nearly as possible the old Menocal lines across the divide as far as Ochoa, and then we followed the north bank of the river to San Carlos. We ran over the best route we could to run the precise levels.

The CHAIRMAN. Your purpose was not to find a canal location?

Mr. JONES. No, sir.

The CHAIRMAN. But to find the heights of the oceans?

Mr. JONES. To find the difference in elevation of the oceans.

The CHAIRMAN. Who was in charge of that survey?

Mr. JONES. Mr. Stephen H. Harris.

The CHAIRMAN. How long did it take you to run that line?

Mr. JONES. About eleven months.

The CHAIRMAN. What was the difficulty that caused you to be so long delayed?

Mr. JONES. It was the nature of the country through which we had to go, through swamps and over the divide. It was quite a difficult country to go through with the line of precise levels.

The CHAIRMAN. Did you work diligently all the time?

Mr. JONES. Yes; we worked steadily.

The CHAIRMAN. You say you encountered swamps?

Mr. JONES. Yes.

The CHAIRMAN. When you came to those swamps, what did you do—go around them or go through them?

Mr. JONES. Go around them when it was possible. Where they were not too deep, we would go through them.

The CHAIRMAN. On the river how did you manage? Did you travel in boats or did you travel on the shore of the river?

Mr. JONES. In going to and from the work we went in boats.

The CHAIRMAN. I mean in conducting the work.

Mr. JONES. In conducting the work we followed the bank of the river as far as possible with the line of levels.

The CHAIRMAN. How did you manage about the lake?

Mr. JONES. We checked with the canal company's bench mark at San Carlos, and started our line from the lake to Brito from a canal company's bench mark near the mouth of the Rio Las Lajas.

The CHAIRMAN. How high did you find the level of the lake above the level of the sea?

Mr. JONES. I do not remember the exact figures.

The CHAIRMAN. Was that ascertained?

Mr. JONES. Yes; that is all in the report.

The CHAIRMAN. The level of the lake, then, was a part of the measurement across the continent at that point to ascertain the height of the oceans on either side?

Mr. JONES. Yes.

The CHAIRMAN. You ran across the lake just as you would across the river or over the land?

Mr. JONES. There had been observations taken, gauge heights at San Carlos and at Las Lajas, on the west side. The elevations of the different sides of the lake were determined by these tide gauge readings. A series of daily readings were taken for quite a while, eight or ten months, at these stations.

The CHAIRMAN. Are those gauges there yet?

Mr. JONES. They are not being read. They may be there, but they are not being observed. The one at San Carlos is there, but the other one has not been read for quite a while. The station was abandoned about a year ago, I suppose.

The CHAIRMAN. After you got through with that work you returned to Washington and assisted in writing up the report of the engineer?

Mr. JONES. I assisted Mr. Harris in his work, getting up the precise-level report.

The CHAIRMAN. Here in Washington?

The CHAIRMAN. When you went back a second time under what authority did you go?

Mr. JONES. I went back in July, 1899, under the Isthmian Canal Commission, headed by Admiral Walker.

The CHAIRMAN. How long did you remain there on that service?

Mr. JONES. I was there from July, 1899, until May, 1901—about twenty-two months.

The CHAIRMAN. What were you engaged in while you were there on that service?

Mr. JONES. I was engaged in the hydrographic work under Mr. Arthur P. Davis.

The CHAIRMAN. Was that hydrographic work executed or performed across the entire isthmus?

Mr. JONES. Yes, sir; the hydrographic work was performed.

The CHAIRMAN. At Brito?

Mr. JONES. No, sir; not on the last Commission. There were no observations taken at Brito, to the best of my knowledge. In fact, I know there were not.

The CHAIRMAN. Where were the observations taken?

Mr. JONES. You mean the different hydrographic stations?

The CHAIRMAN. Yes.

Mr. JONES. There was a station at Tipetapa, between Lake Nicaragua and Lake Managua. There was one at Rivas.

The CHAIRMAN. That is on the lake?

Mr. JONES. That is on the lake. There was a lake gauge read at San Jorge, and there was a station where the Tola River flows into the Rio Grande, four miles from the Pacific. Then on the east side there was a station at Santo Balda, northeast of Granada, on the lake.

There was a station at San Carlos. That is the outlet of the lake, the head of the river. There was one at Los Sabalos and one at Ochore, and at Greytown observations were taken.

The CHAIRMAN. During the time of the Isthmian Canal survey were the readings on these stations kept up regularly?

Mr. JONES. Yes; to the best of my knowledge.

The CHAIRMAN. Did you perform any other service than hydrographic service while you were out there?

Mr. JONES. No, sir; not with the last Commission.

The CHAIRMAN. During those twenty-two months was there any flood in the San Juan River?

Mr. JONES. Yes; there was one heavy flood, caused by the San Carlos River, which discharges into the San Juan at Boca San Carlos.

The CHAIRMAN. About what was the height of the water above the normal in that flood?

Mr. JONES. It rose about 12 feet, I think.

The CHAIRMAN. Above the normal?

Mr. JONES. Yes; I was on the Pacific coast near Brito for a year and a half. I did not know the exact figures of those heights I speak of, but the maximum was something like 12 feet.

The CHAIRMAN. You did not see the flood?

Mr. JONES. No, sir.

The CHAIRMAN. You never saw the San Juan when it was at flood?

Mr. JONES. Not at extreme flood like that.

The CHAIRMAN. Did you ever see the lake in the rainy season when the flood waters were up?

Mr. JONES. Yes.

The CHAIRMAN. What was the rise on the general surface of the lake, the highest during that rainy season that you saw it?

Mr. JONES. About 5 feet, I think, was the highest I remember.

The CHAIRMAN. Was there a like condition in Lake Managua, or was it higher?

Mr. JONES. I do not know. I have never seen Lake Managua at all during the rainy season.

The CHAIRMAN. How did you live while you were out on these campaigns in Nicaragua—in houses, huts, tents, or how?

Mr. JONES. We lived in shacks covered with thatch—thatched huts, covered with selico palm.

The CHAIRMAN. Did you stop your work on account of the weather when it was raining?

Mr. JONES. No, sir.

The CHAIRMAN. Here, when you were running the line, or when you were attending to this hydrographic work?

Mr. JONES. The rain did not stop my work at all. I was out in the rain and all kinds of weather while I was engaged in this hydrographic work, and when on the line of precise levels that I speak of was out in the rain all day. Of course, in the hardest showers or when it was raining very hard we could not work.

The CHAIRMAN. You were exposed to it?

Mr. JONES. We were exposed to all of it.

The CHAIRMAN. About how many men were in that precise-levels party?

Mr. JONES. There were six men.

The CHAIRMAN. And you continued at work for eleven months?

Mr. JONES. Yes, sir.

The CHAIRMAN. In the field?

Mr. JONES. Yes, sir.

The CHAIRMAN. What was the state of the health of those men during that time?

Mr. JONES. It was very, very good. They all had very remarkable health for the kind of country that we went through.

The CHAIRMAN. Did they have any sickness?

Mr. JONES. There was no sickness to amount to anything at all. None of the men were laid up.

The CHAIRMAN. During that eleven months?

Mr. JONES. Not to speak of. A man might be laid up a day or two or something of that kind occasionally, but never ill to speak of.

The CHAIRMAN. You were working right along through these ponds and water courses, and so on?

Mr. JONES. For some distance on the river we encountered heavy swamps. We worked right through them; worked in water up to our knees and sometimes up to our shoulders. We set up the instrument in water almost up to the thumbscrews.

The CHAIRMAN. And none of that party were sick to speak of, as I understand you?

Mr. JONES. No; there was no illness at all in the camp to amount to anything.

The CHAIRMAN. About how many men were engaged under Admiral Walker in Nicaragua on the isthmian canal survey?

Mr. JONES. The Nicaragua Canal?

The CHAIRMAN. The Nicaragua Canal survey.

Mr. JONES. Why, there were about seventy. There were sixty-nine men went down on the Newport and a few more came, and one or two returned to the States. There were about seventy men in all.

The CHAIRMAN. How long were those men employed on the isthmus; I mean to say at Nacaragua?

Mr. JONES. Why, I suppose they were there for eight months anyway.

The CHAIRMAN. In the wet season or the dry season?

Mr. JONES. They were there through a period of both.

The CHAIRMAN. Well, did they work right along through these ponds and morasses?

Mr. JONES. Yes; they worked just the same as I did.

The CHAIRMAN. What was the state of the health of that party during the time they were there?

Mr. JONES. It was remarkably good.

The CHAIRMAN. Did any of them die?

Mr. JONES. No, sir; none of them died while the parties were there?

The CHAIRMAN. Were any of them sick?

Mr. JONES. There was some sickness, but nothing to amount to anything at all.

The CHAIRMAN. What kind of water did you drink while you were out there during all this long service?

Mr. JONES. We drank San Juan River water when we got to it, and when we were back away from it we would drink the waters from the small rivers that were tributaries of the San Juan. We would drink any water that we came to, almost; swamp water or anything else.

The CHAIRMAN. Did you find it good water or bad?

Mr. JONES. Found it very good. That is, it tasted very good, and it did not seem to affect the health of any of the members of the party to amount to anything.

The CHAIRMAN. Are those forests very dense?

Mr. JONES. Yes, sir; they are very dense.

The CHAIRMAN. Give some description of them, if you can. Are the trees large?

Mr. JONES. The trees are very large, but the density is caused by the vines and undergrowth. In some places there along the river the party of natives that we had ahead cutting the road would simply have to cut an arch. The thickness of the underbrush and undergrowth was so great that they would just have to cut a channel right through. Sometimes it was very dark and we would have to cut through all the way. That was the condition in some places.

The CHAIRMAN. In the absence of such a procedure as that was it possible to see any distance in those forests, those thick jungles?

Mr. JONES. No, not when you get back into them; you can not see very far ahead of you.

The CHAIRMAN. How far?

Mr. JONES. Oh, well, to take the average of the country, I guess you could see 40 yards ahead; but in places you could not see 20 feet and in some places you could not see 10 feet ahead of you.

The CHAIRMAN. It is an almost impenetrable jungle?

Mr. JONES. Yes.

The CHAIRMAN. Could you see the hills before you reached them, at any distance?

Mr. JONES. No. Well, it depended altogether upon the nature of the country we were going through. In some places we could see them a good long way off, and then again we could not see them until we butt right into them. In our case we had our line cut out ahead of us, but without this line cut out it would be impossible to tell just what was ahead of us. We would keep a party of natives ahead of the line, about half a day in front, cutting out the road over which we were running the levels.

The CHAIRMAN. What were those natives, Indians, negroes, or white people? What were they?

Mr. JONES. Under the first commission we had Jamaica negroes and a few natives. We had about twenty men in the camp, twenty employees to cut this line and do the rough work around the camps; but on the latter expedition there were very few Jamaicans. They were all native Nicaraguans.

The CHAIRMAN. Are those people diligent in work? Are they industrious people?

Mr. JONES. No; I would not call them industrious people. They are very good men for the class of work that was required of them, that is, cutting out this undergrowth with the machete. They are very good men for that class of work, but they are anything except energetic.

The CHAIRMAN. How is that country through there between Brito and Greytown populated, commencing at the west and coming this way?

Mr. JONES. From Brito to the eastward?

The CHAIRMAN. From Brito to Greytown.

Mr. JONES. You mean along the canal line?

The CHAIRMAN. Yes; along the line you went over.

Mr. JONES. Between Brito and the lake there are two little settlements—you might call them settlements. There are a few houses. They have names, Laffore and Brito. They are the only settlements of any importance at all between Brito and the lake. Then San Carlos, which is a little town of about 500 people, I suppose, at the head of the lake, and about 30 miles below that is Castillio.

The CHAIRMAN. Any other settlement between that and Greytown?

Mr. JONES. No other settlement between that and Greytown.

The CHAIRMAN. Is the country settled out away from the towns?

Mr. JONES. The country is settled by people who make small plantations—banana plantations, etc.

The CHAIRMAN. How is it on the other side, from the lake down to Brito?

Mr. JONES. From the lake to Brito there are farms all along there. The country is used quite a good deal for pasture and then for cocoa raising, etc.

The CHAIRMAN. Is it a fertile country?

Mr. JONES. Very fertile.

The CHAIRMAN. A pretty country?

Mr. JONES. Very pretty.

The CHAIRMAN. Attractive to live in between the lake and Brito?

Mr. JONES. Between the lake and Brito is a very good country to live in, I should say; yes, sir. I lived there for a year and a half, and it is the best part of Nicaragua in which to live that I know of.

The CHAIRMAN. You were not up north in the country surrounding Lake Managua?

Mr. JONES. No; not for any length of time. I have been up there a number of times.

The CHAIRMAN. Away from the lake?

Mr. JONES. Around the edge of the lake.

The CHAIRMAN. What sort of a country is that?

Mr. JONES. It is very good country.

The CHAIRMAN. Is not Nicaragua, generally, over the whole area, a fertile, producing country?

Mr. JONES. Very fertile. The soil is very rich all over it.

The CHAIRMAN. I wish you would describe the bay of Brito in your own way, the bight or bay there at Brito.

Mr. JONES. Do you mean the land surrounding it?

The CHAIRMAN. Yes; I mean the bay and the land surrounding it; the location where the harbor is to be?

Mr. JONES. There is a point called Brito Point that is very high, and the sides are almost perpendicular.

The CHAIRMAN. In what direction is that from the village?

Mr. JONES. There is no village of Brito at all.

The CHAIRMAN. I mean right there at the place they call Brito, the western terminus of the line?

Mr. JONES. The country approaching that is marshy nearly all the year round, that is where the tide comes in. It is low there and the tide comes in. The Rio Grande flows into the ocean there at Brito.

The CHAIRMAN. The mouth of the Rio Grande is at the point that they call Brito?

Mr. JONES. At the point they call Brito.

Mr. CHAIRMAN. Then continuing along with the flow of that River to the sea there is a marshy country?

Mr. JONES. Yes.

The CHAIRMAN. For about what area?

Mr. JONES. There is a marsh back in there for a mile made by the daily high tide.

The CHAIRMAN. That is the place where it is expected to excavate a harbor?

Mr. JONES. Yes.

The CHAIRMAN. Is that marsh covered with trees?

Mr. JONES. With a low, swampy, stunted growth of trees, yes.

The CHAIRMAN. To the north of that, I understand you, there is a high point of coast right on the Pacific?

Mr. JONES. Yes; on the right bank of the Rio Grande there is a very high point.

The CHAIRMAN. About how high?

Mr. JONES. The Rio Grande follows a line of hills down this spur.

The CHAIRMAN. About how high is that spur?

Mr. JONES. That point, I think, is about 70 feet high.

The CHAIRMAN. How far out into the sea does it reach from the marshy place you speak of?

Mr. JONES. This point?

The CHAIRMAN. Yes.

Mr. JONES. I suppose it runs out 20 feet.

The CHAIRMAN. From the marshy place?

Mr. JONES. Yes.

The CHAIRMAN. Is there a curvature there where the Rio Grande empties into the Pacific?

Mr. JONES. You mean in the river?

The CHAIRMAN. No; I mean in the coast line.

Mr. JONES. Yes; there is a curvature. I do not know exactly the extent of it.

The CHAIRMAN. What coast is there on the left bank of the Rio Grande? Is there any high land on that coast?

Mr. JONES. It is very level along there for, I suppose, about a quarter of a mile and then the high ground rises up, hills on the far side.

The CHAIRMAN. So that there are opposing high points, if I understand you, against which the ocean washes?

Mr. JONES. Yes.

The CHAIRMAN. And this bay is in there with the mouth of the Rio Grande River between them?

Mr. JONES. The mouth of the Rio Grande; yes.

The CHAIRMAN. Did you take the tide gauges of the Pacific there?

Mr. JONES. No sir; I had nothing to do with the gauging at the Pacific.

The CHAIRMAN. Were any tide gauges taken?

Mr. JONES. Not while I was there.

The CHAIRMAN. Or measurements?

Mr. JONES. Not while I was there.

The CHAIRMAN. Was there any party in charge of that part of the work, the measuring of the height of the tides there?

Mr. JONES. On this Commission?

The CHAIRMAN. Yes.

Mr. JONES. No, sir; there was none there on this Commission, at Brito. There were no observations taken there at all.

The CHAIRMAN. How was it ever ascertained what the height of the tide was?

Mr. JONES. By the hydrographic work done by the steamship *Alert*. The Government established a bench mark. They took the readings and established a bench mark there at Brito.

The CHAIRMAN. In running your line of levels across the Isthmus there did you start at that bench mark?

Mr. JONES. No, sir; we finished at that bench mark.

The CHAIRMAN. Where did you start?

Mr. JONES. We started at Greytown.

The CHAIRMAN. Did you find a bench mark there?

Mr. JONES. Yes.

The CHAIRMAN. Who put it there?

Mr. JONES. I do not know who put it there. It was a canal company's bench mark, I suppose—the Maritime Canal Company's bench mark.

The CHAIRMAN. Of course Mr. Menocal put it there.

Mr. JONES. I suppose so.

The CHAIRMAN. Who put this bench mark at Brito that you ran to?

Mr. JONES. The hydrographic force on the *Alert*.

The CHAIRMAN. The United States Government put it there?

Mr. JONES. I think they put it there; I am not sure.

The CHAIRMAN. In crossing over from the Greytown bench mark to the bench mark at Brito, did your levels correspond with the bench mark at Brito when you reached it?

Mr. JONES. Yes sir; they checked very closely.

The CHAIRMAN. How closely?

Mr. JONES. Within about a tenth of a foot.

The CHAIRMAN. What was the distance across there?

Mr. JONES. It is 184 miles.

The CHAIRMAN. So that these levels that you ran corresponded with the levels that had been previously run there to the tenth of a foot in 184 miles?

Mr. JONES. Well, I can not say that was the exact fraction.

The CHAIRMAN. I do not mean to say exactly, but that is according to your recollection?

Mr. JONES. Something like that; yes, sir.

The CHAIRMAN. It was not as much as a foot?

Mr. JONES. Oh, no, sir; it was very close.

The CHAIRMAN. It was not as much, according to your idea, as two inches.

Mr. JONES. No, sir.

The CHAIRMAN. You became satisfied then, of course, that your survey was correct?

Mr. JONES. Yes, sir.

The CHAIRMAN. That is, your chief became satisfied that he had run the levels accurately and ascertained the relative elevations of the sea on both coasts?

Mr. JONES. Yes; he was thoroughly satisfied.

The CHAIRMAN. And you found that the level of the sea on the Atlantic coast was higher than on the Pacific?

Mr. JONES. As I remember, it was nine-tenths of a foot.

Senator KITTREDGE. Do I understand you that you checked back and determined the fact that the work was accurate?

Mr. JONES. We had two parties running the line of precise levels, one following the other, about half a day behind; and where there was

any mistake, both parties would go back and run the line over to check up their mistake.

The CHAIRMAN. And there was a complete check of your work all the way through?

Mr. JONES. There was a complete check all the way through from ocean to ocean.

The CHAIRMAN. I think that is pretty skillful surveying through such a country. Now, in crossing from Greytown to Brito what was the first line you run from Greytown to the divide? Was it on the line of the old Maritime Canal survey or some other line?

Mr. JONES. Yes; we just went over the best ground, which was in the same direction as the old Menocal line, but we had nothing to do with the previous line. We went over the best country that we could find over which to take this line of precise levels.

Mr. CHAIRMAN. So you made your line of precise levels without reference to previous surveys at all?

Mr. JONES. Without reference to previous surveys at all, except where we could find and check with a canal company's bench mark.

The CHAIRMAN. That rocky divide is about 3 miles across, is it not?

Mr. JONES. About 4 miles.

The CHAIRMAN. That is on the old Menocal survey. That is where he projected his line of canal. It would take about 4 miles to run the canal through there?

Mr. JONES. Yes.

The CHAIRMAN. That is not the line of the present location?

Mr. JONES. No, sir.

The CHAIRMAN. In crossing there, though, did you come cross any of Mr. Menocal's bench marks?

Mr. JONES. We found three.

The CHAIRMAN. Where were they?

Mr. JONES. The first was on the east of the divide, on the Rio Deseado; the second was on the far side of the divide from Greytown, and the third near the mouth of the San Francisco River.

The CHAIRMAN. How did your survey correspond with these—your levels?

Mr. JONES. Why, we checked very closely, as I remember it.

The CHAIRMAN. When you say "very closely," we do not understand what that means unless you give it in inches or something definite.

Mr. JONES. Well, it checked, I think, within something like two-tenths of a foot.

The CHAIRMAN. In passing on from that bench mark, I suppose you went to the Rio Grande about Ochore, or in that vicinity?

Mr. JONES. We struck the river at Ochore.

The CHAIRMAN. Did you discover any more of Mr. Menocal's bench marks between the divide and Ochore?

Mr. JONES. No; I do not think we did.

The CHAIRMAN. Between Ochore and up the river and across the lake to Brito, did you strike any more of his bench marks?

Mr. JONES. No, sir; no more of them were found at all, except the bench marks at San Carlos. They have a bench mark on an old boiler out in the lake, on the wreck of an old steamship that sticks out of the water there, about a hundred and fifty or two hundred feet off shore. It has settled in the sand to a perfectly firm foundation. They have a bench mark on that boiler. That is a canal company bench mark. We checked on that.

The CHAIRMAN. You do not know who established that bench mark originally?

Mr. JONES. No, sir.

The CHAIRMAN. But it is a bench mark recognized by all the engineers as a settled point?

Mr. JONES. Yes; it is a canal company's bench mark.

The CHAIRMAN. Then it was one which Mr. Menocal established?

Mr. JONES. Yes.

The CHAIRMAN. How did your levels correspond with that bench mark when you reached it?

Mr. JONES. We checked within something like one-tenth of a foot, or a little less, probably.

The CHAIRMAN. Between that and Brito did you find any further bench marks?

Mr. JONES. No, sir; we found no bench marks between there and Brito.

The CHAIRMAN. Did you strike the coast of Lake Nicaragua at the point where the canal is to emerge there, to cross over to Brito, in your survey?

Mr. JONES. Yes; we started there.

The CHAIRMAN. What is the name of that river?

Mr. JONES. Las Lajas.

The CHAIRMAN. Is there a bench mark at Las Lajas?

Mr. JONES. Yes.

The CHAIRMAN. Who established that?

Mr. JONES. That was put in by Mr. Walker.

The CHAIRMAN. Admiral Walker?

Mr. JONES. Admiral Walker's son, J. W. G. Walker, when he started in to run a line of levels in carrying on his work. He had a topographical party, taking the topography of the country all through there.

The CHAIRMAN. Topographical work?

Mr. JONES. Yes.

The CHAIRMAN. And he established that bench mark?

Mr. JONES. Yes; I believe so.

The CHAIRMAN. How did your levels correspond with that bench mark?

Mr. JONES. We started out with his elevation.

The CHAIRMAN. You accepted that without determining it by levels?

Mr. JONES. Yes, sir.

The CHAIRMAN. And that was your base for your survey from there to Brito?

Mr. JONES. Yes.

The CHAIRMAN. Did you establish a bench mark when you got there at Brito?

Mr. JONES. We established permanent bench marks at intervals over the entire line and placed one near Brito.

The CHAIRMAN. What was the correspondence between Walker's bench mark at Los Lajas and the bench mark established by the *Alert* at Brito—how close was the correspondence of the levels you ran?

Mr. JONES. The levels we ran—you mean the difference?

The CHAIRMAN. Yes; how did they correspond? What was the difference between that and the bench mark at Brito established by the *Alert*?

Mr. JONES. You mean the difference in elevation?

The CHAIRMAN. Yes.

Mr. JONES. I do not remember; something like 105 feet.

The CHAIRMAN. Wherever you found a bench mark that Menocal had made, I understand you to say there was very slight variation between that and your line of precise levels?

Mr. JONES. Yes; I would call the checks close.

The CHAIRMAN. What was the state of the health of the party that Admiral Walker had in making that survey there for the Isthmian Canal Commission?

Mr. JONES. You mean the last Commission?

The CHAIRMAN. Yes.

Mr. JONES. Their health was remarkably good for the number of men they had there.

The CHAIRMAN. I think you say they had about 80?

Mr. JONES. Yes; fully that.

The CHAIRMAN. You mean men who went from the United States?

Mr. JONES. Yes; I mean men who went from the United States, unaccustomed to the climate.

The CHAIRMAN. Then you employed also some native laborers?

Mr. JONES. Yes.

The CHAIRMAN. About how large was the entire outfit?

Mr. JONES. Oh, say four hundred and fifty men.

The CHAIRMAN. Out of that number did any die?

Mr. JONES. They lost one man.

The CHAIRMAN. In how long a service?

Mr. JONES. Taking all the work together, probably eight months.

The CHAIRMAN. Now, you had no protection, if I understand you, except the shacks that would be built along at the different camps?

Mr. JONES. That was all.

The CHAIRMAN. What sort of a thing is a shack?

Mr. JONES. A shack is built by putting up four posts, and they build a framework over the top of more poles and cover it with palm leaves.

The CHAIRMAN. What sort of floors are put in them?

Mr. JONES. Why, you would not put in any floor unless it was in a wet, swampy place.

The CHAIRMAN. Then you would put in a floor?

Mr. JONES. In a damp place we would cut poles and lay them on the ground.

The CHAIRMAN. You had no planks or anything of that sort?

Mr. JONES. No, sir.

The CHAIRMAN. Were all of those 450 men employed in the rainy season as well as in the dry season?

Mr. JONES. Yes.

The CHAIRMAN. And in the swamps and marshes?

Mr. JONES. They worked all through the different parts of the country; yes, sir.

The CHAIRMAN. And made no halt at a stream or marsh that they could get across, as I understand you?

Mr. JONES. No; they went right through the swamps; had to do so.

The CHAIRMAN. If I get your idea about it, it was a very exposed surface, so far as the weather and such conditions were concerned?

Mr. JONES. Well, our camps were kept in good shape. We had the very best things to eat that could be bought, and we were splendidly

cared for and were just as comfortable as it was possible to make us in those places, and we always had a dry place to sleep at night.

The CHAIRMAN. Now, about the men: If I understand you, they were exposed to all kinds of weather and all kinds of work?

Mr. JONES. Yes.

The CHAIRMAN. And went regularly and industriously ahead?

Mr. JONES. Yes; that was during the day.

The CHAIRMAN. Of course they came into their shacks and places to sleep at night, I suppose?

Mr. JONES. Yes.

The CHAIRMAN. But was there any attempt to keep the men out of the weather?

Mr. JONES. No; not during the daytime. You can not wait for weather there on the eastern coast, because it rains, sometimes for five or six days or a week without stopping, every day. We could not wait. We would go right ahead, you know.

The CHAIRMAN. Upon the western coast and on the lake it is different?

Mr. JONES. Yes.

The CHAIRMAN. It is a drier country?

Mr. JONES. Yes.

The CHAIRMAN. You spoke of the fact that you lived well; that the food was good. Where did you get the food?

Mr. JONES. The most of the food we had was sent from the States, and it was the very best that could be bought. It was splendid food in every respect, the best canned goods that could be put up. Then, in addition to that, where we could get fresh meats and the vegetables of the country, we always bought them.

The CHAIRMAN. Was there anything like a supply of fresh meat and vegetables?

Mr. JONES. Well, yes, from Ochoa on up, you can get fresh meat occasionally and vegetables, and then there was a good deal of game, you know. We got fresh meat in that way, by killing deer.

The CHAIRMAN. You would have had a hard time if you had been compelled to subsist on the country, would you not?

Mr. JONES. Well, yes; I think we would.

The CHAIRMAN. That is, not on account of its want of fertility, but on account of the sparseness of the population, if I understand you?

Mr. JONES. Yes, sir. Then it is hard for a man to accustom himself, you know, to the vegetables and the way of living of the natives, the stuff that they eat.

The CHAIRMAN. Is it an abundant country for fruits?

Mr. JONES. It is a good fruit country, but fruit is not very abundant, with the exception of bananas and plantains and oranges. On the west side they have quite a number of fruits.

The CHAIRMAN. Orchards?

Mr. JONES. No, no orchards except in some places there are small orchards of fruit of the kind that the fruit venders sell around the streets.

The CHAIRMAN. The fruits are indigenous to that country?

Mr. JONES. Yes.

The CHAIRMAN. How about the production of other things—sugar cane and cocoa and coffee?

Mr. JONES. The production of cocoa is very good. There are some

very fine cocoa fields there, and it is a fine paying business. All the product is sold right in the country. They never ship a dollar's worth out of the country at all. It is a very fine cocoa producing country, and there is a great deal done in the way of raising cattle there. There are very large cattle farms in Nicaragua.

The CHAIRMAN. Do they sell the cattle at home or ship them out?

Mr. JONES. They sell them there and in Costa Rica. They drive them over into Costa Rica and sell them there. Then there is a big business done in cheese.

The CHAIRMAN. In cheese making?

Mr. JONES. Yes.

The CHAIRMAN. How about coffee?

Mr. JONES. In the mountains, at Matagalpa and around Managua and at Granada there is very extensive coffee raising.

The CHAIRMAN. Were you ever up at Matagalpa?

Mr. JONES. No, sir.

The CHAIRMAN. That is a very fine country up there.

Mr. JONES. Yes, very fine indeed.

The CHAIRMAN. Largely occupied by white people, I believe?

Mr. JONES. Yes, there is quite a big American settlement up there.

The CHAIRMAN. How did you find the native population in regard to docility, quietness, and peaceableness?

Mr. JONES. I think they are a very peaceful people. They drink a great deal.

The CHAIRMAN. What do they drink?

Mr. JONES. Aguardiente, Jamaica rum; anything they can get their hands on.

The CHAIRMAN. Is it a good tobacco country?

Mr. JONES. They raise quite a good deal of tobacco.

The CHAIRMAN. Do they manufacture cigars?

Mr. JONES. The cigars they make are very inferior.

The CHAIRMAN. Is that due to the tobacco or to the manufacture?

Mr. JONES. Well, I do not know. I have never looked into the question at all. I do not know whether it is due to the manufacture or to the tobacco.

The CHAIRMAN. Take Nicaragua altogether, and supply it with such transportation as the canal would afford and such people as a canal would draw there for settlement in that country, for agricultural employment and otherwise, would you consider it a pleasant country in which to live?

Mr. JONES. I would consider it a very pleasant country to live in.

The CHAIRMAN. Would you consider it a healthy country?

Mr. JONES. I would consider it a healthy country unless the excavation of the canal makes some change.

The CHAIRMAN. I mean as it is now.

Mr. JONES. As it stands now I would consider it just as healthy as the United States.

The CHAIRMAN. What effect the excavation of the canal would have of course you can not tell.

Mr. JONES. I could not tell about that.

The CHAIRMAN. I do not know that I have any further questions to ask this witness.

Thereupon (at 11.55 a. m.) the subcommittee adjourned to meet Tuesday, February 4, 1902, at 10.30 a. m.

STATEMENT

OF

HENRY G. WORTHINGTON

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *March 10, 1902.*

The subcommittee met at 2.45 o'clock p. m.

Present: Senator Morgan (chairman).

Mr. Henry G. Worthington appeared and was duly sworn by the chairman.

STATEMENT OF HENRY G. WORTHINGTON.

The CHAIRMAN. You were formerly a member of Congress from Nevada?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. In what years?

Mr. WORTHINGTON. Upon the admission of the State in 1864?

The CHAIRMAN. Did you ever visit Nicaragua?

Mr. WORTHINGTON. Yes, sir.

The CHAIRMAN. In what capacity, as a private citizen, a soldier, or what?

Mr. WORTHINGTON. I went there in the interests of the expedition of General Walker.

The CHAIRMAN. That is William Walker.

Mr. WORTHINGTON. Yes; but had no official position, but as a friend of Mr. Walker and of the enterprise.

The CHAIRMAN. How long did you remain there at that time?

Mr. WORTHINGTON. My first trip I remained there perhaps two months, and returned to California.

The CHAIRMAN. When the next time?

Mr. WORTHINGTON. I went down on the steamer *Uncle Sam* the second time, and remained there about a year and a half.

The CHAIRMAN. What were you engaged in while you were there?

Mr. WORTHINGTON. Well, up to a certain period I was advisor of General Walker, traveling through the country, ascertaining the general sentiment of the people, trying to cultivate that as much as possible.

The CHAIRMAN. Were you a soldier, acting?

Mr. WORTHINGTON. No, sir; he offered me a commission in the army but I did not accept it.

The CHAIRMAN. You went through Nicaragua at that time?

Mr. WORTHINGTON. Oh, yes; everywhere from Realejo and Chinandega and Leon to Greytown.

The CHAIRMAN. What length of time did you spend at Greytown?

Mr. WORTHINGTON. I made half a dozen trips to Greytown.

The CHAIRMAN. How long would you stay there on a trip?

Mr. WORTHINGTON. I think perhaps the longest period of staying in Greytown was ten days.

The CHAIRMAN. Did you have a full opportunity to know the health of the country while there?

Mr. WORTHINGTON. I think very abundant opportunity.

The CHAIRMAN. What was the health of the troops with General Walker? What was the condition of their health—the men who were out in the field?

Mr. WORTHINGTON. Generally as good as anywhere.

The CHAIRMAN. How was the condition of the health of the people?

Mr. WORTHINGTON. Well, the people were enervated people, but we never had any general diseases there, even among the army—those who exposed themselves the most. We had sporadic cases of fever now and then, and a case of dysentery now and then, but no general epidemic.

The CHAIRMAN. On General Walker's side and on the side of the parties who opposed him I suppose there must have been a pretty large force in the field compared with the population of that country?

Mr. WORTHINGTON. Yes; we never had, I think, in General Walker's army at any one time over 1,200 men.

The CHAIRMAN. How many men were opposed to you?

Mr. WORTHINGTON. They were detached parties in different parts of the country.

The CHAIRMAN. As many as Walker had?

Mr. WORTHINGTON. I think after they got their recruits from Costa Rica and Honduras, under the leadership of General Gaurdiolo and his assistants, perhaps they exceeded the number of Walker's force.

The CHAIRMAN. What season of the year were the greatest activities between those troops?

Mr. WORTHINGTON. It was generally in the dry season.

The CHAIRMAN. Do you know what the health of the contending armies was?

Mr. WORTHINGTON. I think pretty well.

The CHAIRMAN. What was it?

Mr. WORTHINGTON. Good; subject of course to exposures and isolated cases.

The CHAIRMAN. Anything like an epidemic amongst the troops or anything of that kind?

Mr. WORTHINGTON. Never saw one during the time I was there of any sort.

The CHAIRMAN. You were there in the rainy season and also in the dry season?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. The condition of the troops was the same in both seasons as regards health?

Mr. WORTHINGTON. I did not see any difference as regards sanitation of the people much, except people getting wet.

The CHAIRMAN. They were in the field in both seasons?

Mr. WORTHINGTON. Oh, yes; they were all the time in the field, from the time that Walker landed at Realejo, and went on to Leon and came down; I was most of my time at Virgin Bay, and part of the time at that island directly opposite Virgin Bay.

The CHAIRMAN. What sort of a place is Omotepee.

Mr. WORTHINGTON. I think it is one of the most delightful places that anybody ever visited. There is always good air and plenty of tropical fruits and plenty of shade. Of course you know it is volcanic, but on the low grounds it was very pleasant.

The CHAIRMAN. How high is that shaft?

Mr. WORTHINGTON. I have no idea in feet the altitude; it is quite a high one.

The CHAIRMAN. What would you say of the productive capacity of Nicaragua and its attractiveness as a home for industrial people?

Mr. WORTHINGTON. In the country adjacent to the lake, from Virgin Bay, along through that section near Rivas and St. George, it is beautiful, and there are some very beautiful plantations. That whole country is immensely rich; it is covered with vegetable matter and the undergrowth is very thick.

The CHAIRMAN. That is to the eastward of the lakes?

Mr. WORTHINGTON. Yes, and even along from Virgin Bay away through the lakes after you get over the divide as you approach San Juan del Seur toward the Pacific.

The CHAIRMAN. What kind of a harbor is San Juan del Seur?

Mr. WORTHINGTON. It is almost an open roadstead. Steamers come within perhaps a mile of San Juan del Seur and generally anchor at the side of huge coal barges, from which they get their coal, and the passengers get out in small boats and from the steamer are landed in small boats.

The CHAIRMAN. Were you in Costa Rica while on that expedition?

Mr. WORTHINGTON. Only to Puntas Arenas, on the coast.

The CHAIRMAN. How does Costa Rica compare with Nicaragua as a country?

Mr. WORTHINGTON. I saw so little of Costa Rica that I could hardly form a judgment, because when I went to Puntas Arenas, in the meantime my relations with Walker had changed and I was banished out of Nicaragua and was anxious to get anywhere; so I remained there just a short time.

The CHAIRMAN. How was the health of Greytown while you were there?

Mr. WORTHINGTON. I saw no difference in Greytown, Virgin Bay, or San Juan del Seur other than the fact that there were some swamps immediately around Greytown that made it a little more disagreeable.

The CHAIRMAN. No sickness?

Mr. WORTHINGTON. No, sir; I never knew of any sickness.

The CHAIRMAN. How are the winds at Greytown; from what direction do they come, and with what constancy do they blow?

Mr. WORTHINGTON. I never saw a flood in the San Juan River.

The CHAIRMAN. I say the winds.

Mr. WORTHINGTON. There was always a wind that would sweep down, extending almost the full length of the San Juan River, that made it generally pleasant. I never saw any effect on the San Juan River rising from the winds unless it was that sometimes, when Lake Nicaragua would become rough with the winds, it would sweep the water in a little more volume down the river. There is always a wind, generally over Lake Nicaragua, and sometimes it became very rough.

The CHAIRMAN. Those winds blow constantly through Nicaragua but toward Brito?

Mr. WORTHINGTON. Yes; but I will not say anything about Brito.

The CHAIRMAN. I want to speak of the winds blowing across the Isthmus; I want to know if they go out to sea.

Mr. WORTHINGTON. Oh, yes; always pleasant breeze until you get to San Juan del Seur. I never knew any disease there. I used to talk to the United States consul there, and I saw a great deal of John Priest and old Judge Cushing, who had been formerly a member of Congress and who was the agent at Virgin Bay of the Nicaragua Transit Com-

pany, and also Mr. George Rosette, from Philadelphia, who was a commercial agent and who lived in Virgin Bay, and he was a great deal with passengers who would arrive there, and I very often would take the ride over with them, just to enjoy the breezes.

The CHAIRMAN. Were you out in the country near Matagalpa?

Mr. WORTHINGTON. No; I know of it, but I never was there.

The CHAIRMAN. Was there any rubber production in Nicaragua while you were there?

Mr. WORTHINGTON. No, sir; not that I remember.

The CHAIRMAN. It had not started then?

Mr. WORTHINGTON. No, sir; not that I remember. I did not look so much to the vegetable products of the country as I was watching and looking for concessions in the mineral regions.

The CHAIRMAN. Is that reputed to be good?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. You did not examine it, did you?

Mr. WORTHINGTON. No, sir. I saw quite a number of people there that had been examining it.

The CHAIRMAN. Were you ever in Panama?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. When were you first there?

Mr. WORTHINGTON. I left New York in November, 1849, took the steamer and went to Habana, and there we were transferred to another steamer, the *Eldorado*, that took us to Aspinwall, and from Aspinwall we went up the Chagres River to Gorgona, and from that place we had mules and went over to Panama. I was detained there, with thousands of people, for between some twenty and thirty days.

The CHAIRMAN. Between Gorgona and Panama did you cross the ridge or mountain?

Mr. WORTHINGTON. Yes; we went through what was indeed supposed to be the only passage between the two places.

The CHAIRMAN. That mule route?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. It was a very old route?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. Worn-out in deep gulleys, where it passed through the valleys?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. What was the general characteristic of the country between the Chagres River at Gorgona and along there and the country about Panama—between that and Panama what was the general characteristic?

Mr. WORTHINGTON. My only recollection now is that up to the time you get to Gorgona there was a great deal of shrubbery on the shores. In going up the river we had to pole our way after leaving Aspinwall nearly up to Gorgona. There were four of us in the boat, two gentlemen and two ladies, and Mr. Powell, who afterwards died at Santiago as vice-consul, and we had great difficulty in getting up. Oftentimes he and myself would both have to get out to help off the sand banks.

The CHAIRMAN. What season of the year was that?

Mr. WORTHINGTON. That was along in December.

The CHAIRMAN. Is that the dry season there?

Mr. WORTHINGTON. It was the dry season, and we were surprised to see the condition of it; we were simply told it was because of the wash down in the rainy season.

The CHAIRMAN. What had washed down in the rainy season you had to pass over it in your boat in the dry season?

Mr. WORTHINGTON. Yes; we intended to go to Cruces, which was a few miles beyond Gorgona, because there is a difficulty in getting mules for transportation over, but the river was so low we had to get off at Gorgona.

The CHAIRMAN. Now, that country through is precipitous until you cross the ridge and go over to Panama?

Mr. WORTHINGTON. Yes. It is a hard ride up to within a short distance of Panama, and even in going down on the western slope.

The CHAIRMAN. Is it a volcanic country—a country that had been volcanic?

Mr. WORTHINGTON. Well, that I could not say. I never saw anything volcanic in either country.

The CHAIRMAN. I want to get at the characteristics of the soil, to know whether or not the rainfall upon that would wash it into the river in large bodies.

Mr. WORTHINGTON. I should think so, because it was alluvial soil; it was very soft soil, and my judgment is that it was not thick enough to withstand the deluge of rain that would come down, because I never saw such rains in any part of the world as I saw in Panama.

The CHAIRMAN. Did you encounter any of those rains as you passed up from Gorgona to Panama?

Mr. WORTHINGTON. No.

The CHAIRMAN. It was dry when you went over?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. Have you ever seen a heavy rainfall in that region of country?

Mr. WORTHINGTON. When I was returning home from Congress, General Rosecrans was on the steamer coming out and it rained in such torrents at Colon, as they call it now, that even the railroad deferred its departure for a while. I have seen very heavy rains in Panama, but that is the only occasion that I ever went over otherwise than by railroad.

The CHAIRMAN. How long did you stay at Panama when you went over there?

Mr. WORTHINGTON. Between twenty and thirty days.

The CHAIRMAN. What detained you so long.

Mr. WORTHINGTON. They wanted transportation. There was a great number of passengers who had collected there, because they were coming there all the time from New Orleans.

The CHAIRMAN. How many passengers were congregated there at that time?

Mr. WORTHINGTON. Oh, I don't know; thousands.

The CHAIRMAN. What transportation was furnished there, steam or sail?

Mr. WORTHINGTON. Steam.

The CHAIRMAN. Did any sailing ships come in?

Mr. WORTHINGTON. I do not recall them; no sailing ships coming into Panama carrying passengers.

The CHAIRMAN. Or taking passengers off?

Mr. WORTHINGTON. Or taking passengers off.

The CHAIRMAN. Well, the inducements for their coming there were very great, were they not, if they could have got there?

Mr. WORTHINGTON. Yes; but everybody that was there would rather wait a little while and take the chances of steam transportation to California, because they wanted to get there as quick as they could.

The CHAIRMAN. What was the difficulty about getting on sailing ships.

Mr. WORTHINGTON. I do not know. The Bay of Panama, in the first place, was then, I suppose, as it is now and has been in my trips across the Isthmus since—there is never any wind much in the Bay of Panama, and the approach by water to Panama is very shallow. Steamships have got to lay off some five or six miles from Panama, and then all passengers coming from California or going to California are obliged to disembark there and get on a boat drawing very little water to be taken into the city, and I do not see that there was any very great invitation for a sailing ship to go in the Bay of Panama, because for the want of winds it might stay there for some time.

The CHAIRMAN. Were the tides high that came in there?

Mr. WORTHINGTON. I do not recall the condition of the tides.

The CHAIRMAN. When the tides went out was there any large surface of earth or mud exposed to the action of the sun?

Mr. WORTHINGTON. I do not recall that.

The CHAIRMAN. Do you remember to have seen that bay around Panama entirely stripped of water when the tide would go out?

Mr. WORTHINGTON. I do not recall. It would be strange if it did not, because there was so little wind; and on the receding of the tide, it goes down so gradually up to the point where the steamships lay, it strikes me it must necessarily have been very much exposed. We had a great many passengers get on the steamer on which I went to California, more than the steamer was capable of holding, and the result was that we had a great deal of sickness.

The CHAIRMAN. On the steamer.

Mr. WORTHINGTON. Yes.

The CHAIRMAN. What kind of sickness?

Mr. WORTHINGTON. Well, they called it the Chagres fever, and some would call it the Panama fever.

The CHAIRMAN. Was there any yellow fever in Panama while you were there?

Mr. WORTHINGTON. I never heard of any, sir.

The CHAIRMAN. Well, was this epidemic or this affection of Chagres fever or Panama fever a general thing in the city?

Mr. WORTHINGTON. Oh, yes; yes, indeed. It was a general apprehension in California how people coming by that route would avoid fever.

The CHAIRMAN. Did you ever stop at Panama any length of time after that visit?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. How long?

Mr. WORTHINGTON. Ten or fifteen days.

The CHAIRMAN. How did you find the health of the town when you got there that time?

Mr. WORTHINGTON. I did not see a bit of difference from the condition when I first crossed Panama. I went there from California to go down the coast to Chile.

The CHAIRMAN. It was still sickly?

Mr. WORTHINGTON. Yes; the Panama fever prevailed then and prevails now; at least, that is the general understanding.

The CHAIRMAN. Did you make any examination or hear any reports or statements while you were there in regard to the prevalence of yellow fever in Panama?

Mr. WORTHINGTON. I do not recall it, sir.

The CHAIRMAN. Or on the Isthmus?

Mr. WORTHINGTON. I do not recall it.

The CHAIRMAN. Were you ever there in the dry season?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. And in the wet season?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. Which is the healthiest season at Panama?

Mr. WORTHINGTON. Well, for myself, in all of those tropical countries, I prefer the wet season if it was not a protracted season. I did not stay there long. In the dry season it is arid and uncomfortable, and if you are there when you can protect yourself as in California, I would rather be there in the wet season than in the dry season.

The CHAIRMAN. What is the situation of Panama—is it built up on a rock shelf?

Mr. WORTHINGTON. No, sir; it comes very gradually. It seems to be built simply upon the surface of the ground. The buildings we had there then were all temporary structures, to meet the demand that was made upon them; they were wooden buildings, and there were some few old adobe buildings, but comparatively few. There was a great desire to escape from the intensity of the sun at seasons in Panama, a greater desire to escape that than to escape the rain, on account of the heat.

The CHAIRMAN. In passing up and down the Chagres River did you come across bars or patches of material that had been brought down by the floods?

Mr. WORTHINGTON. Oh, yes; we had to push our boat over it.

The CHAIRMAN. Were they extensive or not?

Mr. WORTHINGTON. They were constant, almost continuous. I have forgotten the distance from Colon to Gorgona, but we had two men, and Mr. Powell and myself, and it took us a long time to make that distance.

The CHAIRMAN. About how long?

Mr. WORTHINGTON. My recollection is that we started from Colon in the morning and got to Gorgona just about dark, or a little after dark.

The CHAIRMAN. From Crusez—from the mouth of the river?

Mr. WORTHINGTON. From Colon to Gorgona. Crusez is farther up.

The CHAIRMAN. There are two towns of that name, one at the mouth of the river. You did not come in at the mouth of the river; you came from Colon and went across the country until you struck the Chagres River?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. And took the Chagres River at Gatun, I suppose?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. How does the country in Panama that you saw compare with Nicaragua as a country of production for farms?

Mr. WORTHINGTON. I think there is no comparison between the two. Of course I saw less of Panama than I did of Nicaragua and I know more about Nicaragua than I do about Panama, because I was not off the main line in going through, but I have been so much over Nicaragua from Greytown up that I knew it pretty tolerably well. I think Nicaragua is very desirable and a very valuable possession. Of course it has to pass through all of those periods that all tropical countries have. It is rich and it is fertile and I have run about a good deal in my life, and I was about as healthy in Nicaragua as I ever was. Of course there were sporadic cases of sickness, but that came both from indulgence and unnecessary exposure.

The CHAIRMAN. Would you regard Nicaragua as a country that is likely to be a valuable contributor to a canal built through it?

Mr. WORTHINGTON. I should think so.

The CHAIRMAN. That is, would be settled up with a strong, industrious population?

Mr. WORTHINGTON. I should think so. I do not want to pretend to give any opinion of the relative engineering proposition involving the two countries, but to me there is no comparison in the two routes in any sense. I do not attach as much importance as many do to the fact that the Nicaragua route is so much longer, because there is that waterway, and that San Juan River which may be greatly utilized, and the climatic conditions, and the character of the country; its capacity for productiveness and its resources.

As to the population, I think even in that regard the population of Nicaragua is far preferable to that of Colombia, because Colombia, of course, is filled up with those Jamaica people; and while the population of Nicaragua is somewhat indolent and enervated, for everything grows spontaneously, the people are not required to work hard for a living, they can sleep out under the orange trees in the orange groves at night—

The CHAIRMAN. They have to make no preparation for the winter?

Mr. WORTHINGTON. No; our winters there—at least it was my experience that it was like the winters of South Carolina and other States.

The CHAIRMAN. Crops grow there in the winter months, do they not?

Mr. WORTHINGTON. Oh, yes; they grow all the year round.

The CHAIRMAN. So that a man does not have to work in the summer to provide something to live on in the winter?

Mr. WORTHINGTON. No; and they are not going to do it. They can go out any time and pick up what they want.

The CHAIRMAN. And out of the three hundred and sixty-five days in the year a man has more working days on the farm?

Mr. WORTHINGTON. Yes; and everything is prolific.

The CHAIRMAN. And where men can plant successive crops for supplying themselves with substance of course they do not want to be at work all the time?

Mr. WORTHINGTON. I think between St. George and Rivas there is a plantation that has not its parallel in almost any place in the world, a large hacienda, surrounded by a magnificent cactus fence, and an old American house on it. It was owned by Dr. Stansbury, of Baltimore, who had married into a native family, and he was then engaged in the practice of his profession and raising such things as he desired. And there are just as many other places capable of having just as fine plantations as he had.

The CHAIRMAN. Is it a good grazing country for raising cattle, and horses and mules?

Mr. WORTHINGTON. I should think so.

The CHAIRMAN. Well, do they raise cattle and horses and mules?

Mr. WORTHINGTON. Yes.

The CHAIRMAN. In abundance?

Mr. WORTHINGTON. Well, I can not pretend to say about that. Like all these Spanish cattle, they raise pretty tough cattle, but the whole atmosphere in Nicaragua is different from that of Panama.

The CHAIRMAN. You mean that it is a better atmosphere.

Mr. WORTHINGTON. Yes.

The CHAIRMAN. Well, what particular objection would you have to the atmosphere in Panama, if any?

Mr. WORTHINGTON. Well, when you go to Colon—I went there first

to Aspinwall and I observed it in Colon, although Colon has been very much improved since, and steamers run right up to the wharf and the ground has been filled in. There is only one street in Colon that you can ride through, and immediately back of it there is stagnant water where the little houses that are occupied by the poor people are built up on poles, and there it is covered with a green substance, just as you see in all stagnant waters in tropical countries. Now no place like that can be healthy and have such a thing as that. I was never sick in Nicaragua.

The CHAIRMAN. Did you see any considerable openings or opportunities for farms between Colon and Panama?

Mr. WORTHINGTON. None at all. There is no room for them.

The CHAIRMAN. Why no room?

Mr. WORTHINGTON. Because it was on the river bank, and they do not seem to be able, or when the river is high it will overflow, and when you get away from the river bank between Gorgona and Panama, why, you are simply in a gorge of a mountain.

The CHAIRMAN. So that it is not a country that would yield anything of value to commerce.

Mr. WORTHINGTON. I should not think so. I do not know anything about what it is like up near the Magdalena River country.

The CHAIRMAN. The Magdalena River is away down on the continent of South America.

Mr. WORTHINGTON. The Magdalena River is up near Bogota.

The CHAIRMAN. That is down in the heart of the continent, or at least on the continent and not on the Isthmus?

Mr. WORTHINGTON. No, sir.

The CHAIRMAN. I am speaking of the isthmian country.

Mr. WORTHINGTON. I saw nothing in the world there in the nature of facilities for farming that would command the attention of anybody.

The CHAIRMAN. You would expect no contributions to commerce from that part of the country?

Mr. WORTHINGTON. None in the world.

The CHAIRMAN. And in Nicaragua you would expect more contributions?

Mr. WORTHINGTON. A great deal more.

The CHAIRMAN. That is all I have to ask you.

The subcommittee then, at 3.15 o'clock p. m., adjourned.

STATEMENT

OF

MR. H. H. TRUNDLE

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

FEBRUARY 27, 1902.

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman), Hanna, Kittredge, and Foster.

Mr. H. H. Trundle appeared before the committee and was duly sworn by the chairman.

STATEMENT OF MR. H. H. TRUNDLE.

The CHAIRMAN. You are a civil engineer?

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. In what schools were you educated in civil engineering?

Mr. TRUNDLE. The Virginia Military Institute.

The CHAIRMAN. Any other?

Mr. TRUNDLE. No, sir.

The CHAIRMAN. How long have you been acting as a civil engineer?

Mr. TRUNDLE. Since 1887; that is, about fifteen years.

The CHAIRMAN. Have you been engaged in charge of public works or as subordinate engineer?

Mr. TRUNDLE. I have been engaged in charge of railroad work.

The CHAIRMAN. As chief engineer?

Mr. TRUNDLE. I was chief engineer of some surveys in Florida and I have been principal assistant on the railroad work. I have had charge of several roads of minor importance. There would be a chief engineer of the railroad, but I would be his only representative on the ground.

The CHAIRMAN. You were the working engineer?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Have you got any works in Florida now?

Mr. TRUNDLE. No, sir; the work that I did there was simply a survey, and it was about the time of the freeze in the early part of the nineties, and they never built the road.

The CHAIRMAN. What length of line did you survey there?

Mr. TRUNDLE. I surveyed 108 miles, I believe it was, and then made a recognizance and report on about that much more.

The CHAIRMAN. Did you locate the road?

Mr. TRUNDLE. I located it for a distance of 108 miles; that is, everything except running in the curves.

The CHAIRMAN. What employment have you had, if any, in Nicaragua on the Nicaraguan Canal route?

Mr. TRUNDLE. Well, I went there with the Nicaraguan Canal Commission.

The CHAIRMAN. Headed by Admiral Walker?

Mr. TRUNDLE. Headed by Admiral Walker, and on that Commission while in Nicaragua I was assistant engineer and made the survey; in retracing the Menocal route.

Senator HANNA. What year was that?

Mr. TRUNDLE. 1897 I believe it started, and I retraced the Menocal route to Ochoa and then ran possibly half or maybe a little over half of the preliminary line back down what has been termed the low-level line and which is practically the same as the proposed location for the isthmian and also for the Nicaraguan Canal Commission's route——

The CHAIRMAN. This work you speak of, you did under the Nicaragua Canal Commission, of which Admiral Walker was president?

Mr. TRUNDLE. Yes.

The CHAIRMAN. How long were you engaged at that work?

Mr. TRUNDLE. I was on the Isthmus very nearly a year, I think about ten and a half months or something like that, and then I came back to the United States and had charge of a part of the estimates. I first projected the location all the way up to Boca San Carlos, and then, besides the working up of the estimates on excavation for the canal, I was assigned the working up of the estimates for the locks and also the designing and estimating for the Boca San Carlos dam. When I took up the work on the dam, that part of the canal work between Greytown and Serapiqui was put in charge of another engineer, so that on the final work for the Nicaragua Canal Commission between Greytown and Serapiqui, the locations and estimates were made by another engineer; but that between Serapiqui and Boca San Carlos and the locks for the entire route, the estimate was worked up under my direction, as was also the Boca San Carlos dam.

The CHAIRMAN. You had the working up of the estimate in charge upon the works that you have mentioned?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Were you in exclusive charge? Were you superintending that?

Mr. TRUNDLE. Well, the Nicaraguan Canal Commission had a chief engineer here, and I submitted my work to him.

The CHAIRMAN. And the question was whether he approved or disapproved it?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Did he approve it?

Mr. TRUNDLE. Yes; he never disapproved any of it that I remember.

The CHAIRMAN. He did not see it; he did not do it himself?

Mr. TRUNDLE. No, sir.

The CHAIRMAN. He got the facts from you and then he approved your estimate.

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. Then you were afterwards at work for the Isthmian Canal Commission?

Mr. TRUNDLE. Yes.

The CHAIRMAN. For how long?

Mr. TRUNDLE. For about two years with the Nicaraguan Commission, or within a month of it.

The CHAIRMAN. What part of that was in the office?

Mr. TRUNDLE. About half of it.

The CHAIRMAN. And half in the field?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Now, with the other, the Isthmian Canal Commission?

Mr. TRUNDLE. I was with them a little more than two years—two years and four months, I believe.

The CHAIRMAN. How much of it in the field and how much in the office?

Mr. TRUNDLE. One year in the field and the rest of it in the office.

The CHAIRMAN. You mean a year of consecutive service in the field?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Now, what part of the work did you have charge of under the Isthmian Canal Commission?

Mr. TRUNDLE. That portion between Greytown and a point a little above the location of the Boca San Carlos dam site.

The CHAIRMAN. So that during these two tours of surveys down there you had practically the same territory under your charge?

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. Did you survey it personally?

Mr. TRUNDLE. Yes—well, I had four engineering parties under me this last time and I spent my time between them in looking over the work.

The CHAIRMAN. Well, you were personally in the field, if I understand it, supervising the work of the engineering parties that were under you?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Now, on the first occasion of your work there under the Nicaraguan Canal Commission, did you have any parties of engineers under you then?

Mr. TRUNDLE. None, except the party I had charge of. I was actually in the field with that all the time.

The CHAIRMAN. You were in personal charge of that party?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And in the other you had four engineering parties under you and you would visit from one to the other and examine and scrutinize their work?

Mr. TRUNDLE. Yes.

The CHAIRMAN. In making the actual survey on the face of the earth, did you ever conduct a survey above or much above the mouth of the San Carlos?

Mr. TRUNDLE. No; not much above.

The CHAIRMAN. You did not go up to what is Lock No. 4 now?

Mr. TRUNDLE. Oh yes; Lock No. 4 is below the mouth of the San Carlos.

The CHAIRMAN. How high above Lock No. 4 did you go?

Mr. TRUNDLE. I think it was about a distance of 2 or 3 miles.

The CHAIRMAN. How far from Conchuda?

Mr. TRUNDLE. Well, about 2½ miles, or something like that.

The CHAIRMAN. And there your division stopped?

Mr. TRUNDLE. Yes; my division stopped at what is known as Caño Tigre; it is just above the Boca San Carlos dam site.

The CHAIRMAN. Who took up the next division above that?

Mr. TRUNDLE. In the Isthmian Canal Commission it was under two division engineers, F. L. Stewart a part of the time, and afterwards A. B. Nichols.

The CHAIRMAN. Now, in making these several surveys how wide a scope of territory did you examine, taking the actual line of the canal as the center; how wide a scope of territory on either side did you examine with a view of canal construction or location?

Mr. TRUNDLE. Well, that depended very much on the country. For instance, you take the swampy section down near Greytown, it was pretty much on the same level everywhere, and there we only made detours around through the country to see whether there were or were not slight rises or something that would give good foundations at places where we desired embankments. The ideal line was a straight line to the point at which we had to strike the hill country, and when we got to that hill country we developed there for various widths—we did considerable amount of exploring work to see whether there was a stream or a valley of consequence that we could take advantage of, and then we would run our lines out across there.

A good many of them were run simply to show the reason for making bends. We knew from the recognizance that we could not get over there, but I wanted to have it so plain that it could be put on the map, and thus explain the reason for putting the line where we did. The width developed varies. In some places it was $1\frac{1}{2}$ or 2 miles wide and in others we ran long spur lines out along the ridges to show that we had gotten the best crossing through them, but did not develop the ridges fully. For instance, if we were crossing a ridge at an elevation of 100 and we ran on that ridge and proved that was rising until we got to a point where we could see it joined the main backbone or main ridge, then we would stop, and would simply record these elevations, so as to show the reason for our not having gone farther to right or left as the general alignment would seem to make desirable.

The CHAIRMAN. Well, you ran a great many lateral lines, then?

Mr. TRUNDLE. Yes; a great many.

The CHAIRMAN. Could you form any idea of how many miles it would be?

Mr. TRUNDLE. I intended to work it up; but I know, for instance, in the development of the ridge south of Boca San Carlos, when we thought we were going to have the dam at that point. In proving both that there was no way for the water to get around on that side and also to find if possible a suitable site for a wasteway on the lower side, I think, as I remember it, there was something like 67 or 68 miles of lateral lines run.

The CHAIRMAN. That was one lateral line that you run?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Well, I suppose it is sufficient to say that you examined the whole country thoroughly?

Mr. TRUNDLE. Yes.

The CHAIRMAN. At every point where you saw there was any trouble?

Mr. TRUNDLE. At every point where it looked like we were not getting on good ground for a canal, or where we felt in doubt as to whether we might not improve it in some way.

Senator HANNA. Is that a part of the line in which there are so many curves that you had to try to avoid?

Mr. TRUNDLE. Yes.

Senator HANNA. That is, the difficulty that you encountered there made it necessary to make curvatures?

Mr. TRUNDLE. Yes.

The CHAIRMAN. In order to get the ground you speak of.

Mr. TRUNDLE. Yes.

Senator HANNA. I understand you.

The CHAIRMAN. What old surveys do you speak of that you used for reference?

Mr. TRUNDLE. For reference we used the Maritime Canal Company's surveys.

The CHAIRMAN. The low line run by the Maritime Canal Company?

Mr. TRUNDLE. Yes; we used that and used the others as references also; but in our previous work we had verified that work of the Maritime Canal Company, the Menocal route, as it is spoken of—

The CHAIRMAN. You mean the one that crosses the divide?

Mr. TRUNDLE. Yes.

The CHAIRMAN. How did you find—correct?

Mr. TRUNDLE. Yes; I found it particularly good work.

The CHAIRMAN. Then, Mr. Menocal run what is called a lower line.

Mr. TRUNDLE. Yes; we used that to some extent, but we used it principally as a guide in starting our own investigations there.

The CHAIRMAN. Go on.

Mr. TRUNDLE. That is, what they had was platted on a map and we used that as a guide in a general way and we tied to their old survey, and I think—well, I know I may plainly say that practically everything that in any way affects the canal along this low-level route, as you might call it, is from the notes either of this Isthmian Commission or from the Nicaragua Canal Commission. We tied in all the surveys so that we could use those and check them up where there appeared to be any error in anything.

Senator HANNA. Did you use any part of the Menocal survey made for the Maritime Canal Company?

Mr. TRUNDLE. Well, on my division, no, sir. Now, I say no. We did run up through one little gap at the head of the Florida lagoon, through which the Menocal route passed, in the region of Lock No. 3. Our Lock No. 3 is practically on a portion of their line.

The CHAIRMAN. Now, then, you had, if I understand you, on the surveys that preceded you, all of them, so that you had Childs's and Lull's and Menocal's?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And Walker's Nicaraguan Commission?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And you tested the lines that you put down in the location of the Isthmian Canal Commission by reference to these former surveys?

Mr. TRUNDLE. Yes; we had the notes of practically all those lines. We had some of Child's notes. There were one or two branch surveys that I think were made by the Maritime or the Nicaraguan Canal Company—I don't know which—that we did not have the notes for; we took only the maps for these, but in the majority of the cases we had the actual notes, and we would know at these places that we ought to be a certain distance by calculation from certain other places, and where there were any appreciable differences we checked over our work again to be sure that we were right.

The CHAIRMAN. You got it to a point where you felt certain you had the proper measurements and levels?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And where you felt certain you had the best location for a canal? I mean the last canal.

Mr. TRUNDLE. Yes; I think so. You will probably remember in the report that there were some places where there was some objections to sand that was on the route, and it is possible to get around that sand, it being a matter of opinion as between engineers whether it is better to try to get around it or to go through it. Personally, I do not think there is any trouble with it, when you take into consideration the precautions that we took in the estimates to guard against any damage that this sand might cause, for we allowed for puddling it—we took the excavation out extra wide so as to allow for puddling. In other words, that is putting clay on it, which is rammed in and made impervious to water, and even should there be a slight leakage it would make no difference.

The CHAIRMAN. Now, what is the distance from Greytown to the hill country of which you speak—the first ridge or hill that you encounter on the line that you located there for the Isthmian Canal Commission?

Mr. TRUNDLE. Well, the first lock is practically in the first hills that we strike, but there are hills on either side.

The CHAIRMAN. How far is that from Greytown?

Mr. TRUNDLE. 7.44 miles from Greytown, or about nine and a fraction miles from the 6-fathom curve.

The CHAIRMAN. The 35-foot curve?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Now, I want you to describe to the committee the character of the country over this part of it, from Lock No. 1 into Greytown.

Mr. TRUNDLE. I would like to look at the map [referring to a map]. Well, we start here, and the center line of our harbor runs due north, so that the jetties are here and will furnish proper protection. They very seldom have a wind directly from the due north there. It is either a little to the east or the west of north, and the reason for putting these out here is twofold. First, in order to get proper protection, and also because it is perpendicular to the coast line at the point where we have located the harbor, and we get the deep water sooner than we would with a line in any other direction.

The CHAIRMAN. Did you make a location of the jetties in the harbor?

Mr. TRUNDLE. I ran this line, the center line of the canal, but the jetties are not actually located on the ground. They are simply projections here, but we had the soundings, etc., so that we got the map of the ground and could estimate what was necessary.

The CHAIRMAN. You did not locate the jetties for the purpose of construction?

Mr. TRUNDLE. No, sir.

The CHAIRMAN. But for the purpose of ascertaining whether they are practical or not?

Mr. TRUNDLE. Well, no; we did not really locate the jetties at all, but—

The CHAIRMAN. You projected them?

Mr. TRUNDLE. Yes.

The CHAIRMAN. On that basis?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Now, from the jetties or from the harbor right along in, your maps show that it is a straight line to where?

Mr. TRUNDLE. It is a straight line up to about $5\frac{1}{2}$ miles from the harbor. Now, before I leave this map, I will say that from the west edge of this lagoon, known as the Greytown Lagoon, we strike a country that is sand, and it is only a few feet above the level of the sea. Here near Greytown, the first mile or so, it is sand up to the surface, and then we gradually get to a country where there is more or less soft material or decayed vegetable matter on top. Up to the San Juanillo River, which is about 5 miles from this 6-fathom curve, this soft material is only a few feet in depth. Just at the crossing of the San Juanillo River, for a few hundred feet on each side, it is deeper, probably 10 or 15 feet.

The CHAIRMAN. What do you call that—the San Juanillo?

Mr. TRUNDLE. Yes.

The CHAIRMAN. That is the little San Juan?

Mr. TRUNDLE. Yes.

The CHAIRMAN. What do you do with that river?

Mr. TRUNDLE. We divert it into the Maritime Canal Company's old excavation.

The CHAIRMAN. How long an excavation is that?

Mr. TRUNDLE. A mile and a half.

The CHAIRMAN. They had excavated a canal a mile and a half?

Mr. TRUNDLE. No, sir; I thought you meant the diversion. It (the Maritime excavation) is only three-quarters of a mile.

The CHAIRMAN. Then you divert the San Juanillo into the old cut of the Maritime Canal Company?

Mr. TRUNDLE. Yes.

The CHAIRMAN. I suppose this line running to the left of the excavation is the railroad line.

Mr. TRUNDLE. Yes.

The CHAIRMAN. And running out toward the rock divide.

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. What is the length of that diversion?

Mr. TRUNDLE. It is less than a mile and a half.

The CHAIRMAN. I want to get the compass direction. Is this north and south?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Your canal line there lies on the line that you have described which runs to the north of the San Juan River.

Mr. TRUNDLE. Yes.

The CHAIRMAN. How far away from it?

Mr. TRUNDLE. It is several miles. Here, you see, is the San Juan right along here; it would be, I think, about 3 or 4 miles at this point.

The CHAIRMAN. Is there any necessity at all for embanking that canal for the purpose of keeping the San Juan River out of it?

Mr. TRUNDLE. This stretch in here?

The CHAIRMAN. Yes.

Mr. TRUNDLE. There is no necessity for making any other embankments than what you would necessarily have to make in taking the materials out.

The CHAIRMAN. Is that to guard against the waters of the San Juan or to guard against the surface water that comes from the constant rains there?

Mr. TRUNDLE. In a section of that size the surface water that would come in there would not amount to much.

The CHAIRMAN. Does the San Juan ever flood this section in here?

Mr. TRUNDLE. It is supposed to.

The CHAIRMAN. Did you have data to show that it ever did?

Mr. TRUNDLE. No; no absolute data, or marks that I have ever seen, beyond the formation of the ground. It is supposed that there has been a foot or two of water over it, which is very little, anyway.

The CHAIRMAN. So you took that into calculation in projecting that line here?

Mr. TRUNDLE. Yes.

The CHAIRMAN. How far does that much of the line diverge from the former surveys of Lull, Childs, Menocal, and Walker?

Mr. TRUNDLE. Well, it is practically the same thing as Walker. The Menocal——

The CHAIRMAN. That is the divide line. I mean the low level of the canal?

Mr. TRUNDLE. There is not much difference; I don't know how far it would be; I could not say.

The CHAIRMAN. But they all run along in the same direction?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And through the same country?

Mr. TRUNDLE. Yes.

The CHAIRMAN. I want to get at this: Did you examine the soil in this cut of the canal which you have drawn upon this map here, the old canal dug by the Maritime Canal Company?

Mr. TRUNDLE. Yes.

The CHAIRMAN. What kind of soil is that?

Mr. TRUNDLE. Sand.

The CHAIRMAN. What kind of sand?

Mr. TRUNDLE. The same sort of sand that you find along the beach here. It is a dark sort of sand, and probably of volcanic origin.

The CHAIRMAN. Was that the impression, that it was of volcanic origin?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And had been brought up from the San Carlos River and Serapiqui from Costa Rica?

Mr. TRUNDLE. Yes; it is generally so supposed. I do not profess to be much of a geologist, but it is generally supposed that this whole delta from the hill country has in ages past been formed in about that way.

The CHAIRMAN. What I want to get at is this—having examined this canal cut here, and I suppose you also examined the railroad embankment that has been laid from that canal——

Mr. TRUNDLE. Yes.

The CHAIRMAN. How does that weather—that embankment?

Mr. TRUNDLE. I think it stands in a bank steeper—I know it stands steeper than any sand I ever saw, and I think that is partially due to the fact that in that country you know something grows on anything that you can give it a chance to grow on. As soon as you pile up any earth of any kind that you get there, why there is this smaller growth

which springs up, and these slopes stand very steep; they stand steeper than we used in estimates for sand.

The CHAIRMAN. You could have made a steeper slope with apparent safety?

Mr. TRUNDLE. Well, we realized the fact that this had not been subjected to any current.

The CHAIRMAN. You say this—you mean the canal cut that is there now?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Has never been subjected to a current?

Mr. TRUNDLE. No, sir.

The CHAIRMAN. Now, I want to get at this proposition; I want to know what you have got to say about it. From this lagoon here, or bay or harbor, out to where you strike the San Juanillo River, what is the difference between the characteristics of this country in that State and the country at the points where this old canal of the Maritime Canal Company was dredged for upward of three-quarters of a mile?

Mr. TRUNDLE. I don't think there is any difference.

The CHAIRMAN. Would you expect a canal to stand as firmly on the ground that you located as the isthmian canal route as you would over here a mile and a half away?

Mr. TRUNDLE. Yes.

The CHAIRMAN. So that practically it is the same sort of country?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Now, are there any swamps between Greytown and Lock No. 1?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Where are they?

Mr. TRUNDLE. There is a swamp here before you get to the San Jaunillo; that is, a swampy country. In walking through this section you would sink down in this mud about 6 or 8 inches and sometimes a foot, and in occasional places more. It is a flat country. Sometimes a large portion of it is covered with water, and it is swampy in that, but taking it in the meaning of swamp when you speak of it as being a bad foundation for this work, it is not, because that mud is so shallow that it would make no difference after taking the vegetation off. An embankment made of the material from the canal deposited on this mud would be sufficiently tight for practical purposes.

The CHAIRMAN. The surface of the earth or matter there is alluvial?

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. Decomposed vegetation?

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. And it forms a mud?

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. And that rests on a bed of sand?

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. The same kind of sand that you speak of in this cut?

Mr. TRUNDLE. Yes, sir.

The CHAIRMAN. That railroad?

Mr. TRUNDLE. Yes.

The CHAIRMAN. That railroad track is how long?

Mr. TRUNDLE. Eleven miles.

The CHAIRMAN. Is it a good firm road now for working while you were there?

Mr. TRUNDLE. Yes, except in places where they apparently did not put in large enough openings to allow the water to pass. They shut off the drainage by these railroad embankments in places, and in these places the embankments and small trestles have washed out.

The CHAIRMAN. I know; but what I want to know is as to the general embankment that is put there.

Mr. TRUNDLE. It is firm.

The CHAIRMAN. A good railroad bed?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And runs right through the swamp, does it not?

Mr. TRUNDLE. Yes.

The CHAIRMAN. For how long; what distance?

Mr. TRUNDLE. It runs through swamp about 7 miles.

The CHAIRMAN. Is that swamp work in its characteristics different from the swamp that you are going through here?

Mr. TRUNDLE. No; I don't know that it is. I think it is worse out in the vicinity of the lagoon—the Bernard Lagoon—which is along here. It is worse apparently than anything that we strike up to the San Juanillo River.

The CHAIRMAN. After a careful examination of that country in which you located that canal, do you find any difficulty in your conclusion that it is a safe and sound location for the canal?

Mr. TRUNDLE. None whatever. It is perfectly safe, so far as my judgment goes, and perfectly simple; there is nothing in the world but to go in there and to dredge out that material, which is a light and a cheap material to move.

The CHAIRMAN. You mention dredging. Well, you can do dredging, then, practically, from lock No. 1 into Greytown?

Mr. TRUNDLE. Practically.

The CHAIRMAN. How much of the distance is there that you can not dredge, that whole length there?

Mr. TRUNDLE. Well, I may have misled somewhat. We strike a worse country after we get up about a mile beyond the San Juanillo up to the Misterioso; we strike a mile of country in there where the mud is a good deal deeper.

The CHAIRMAN. Could you dredge that mud?

Mr. TRUNDLE. Oh, yes.

The CHAIRMAN. How much of the distance between Greytown and lock No. 1 is open to dredging work?

Mr. TRUNDLE. Between the 6-fathom curve and lock No. 1 we can dredge practically about 8 miles.

The CHAIRMAN. Now we will go above lock No. 1. How much of dredging can you do between that and lock No. 2?

Mr. TRUNDLE. Well, there is about between 7 and 8 miles, nearer 8, I should say, that could be dredged there.

The CHAIRMAN. How much between Lock No. 2 and Lock No. 3?

Mr. TRUNDLE. I do not know, but I would say there would be about 10 miles.

The CHAIRMAN. Between Locks 2 and 3?

Mr. TRUNDLE. Yes.

The CHAIRMAN. How much between Lock No. 3 and Lock No. 4?

Mr. TRUNDLE. Well, there is very little dredging in that. I do not suppose there would be more than a couple of thousand feet—

The CHAIRMAN. Now, the cuts that you would have to pass through

where you could not dredge, do they furnish any insecurity that you discovered, or that you thought you discovered, as to the permanency and feasibility or practicability of the canal, that you have located, in these cuts?

Mr. TRUNDLE. Well, I think none, unless possibly just beyond Lock No. 4. There is a place where we took unusual precautions in our estimates. After going through soft rock and hard rock with our borings we ran into some more earth.

Senator HANNA. What was that earth?

Mr. TRUNDLE. It was clay, and in that portion it was thought—discussing the matter with the Commissioners—that in order to be on the safe side, it would be well to take all of that material out at an earth slope, and in that way we would have no portion of it with the earth doing more than what we expect earth to do everywhere; that is, we would not have any great amount of superimposed load above this clay, and there was only a little place where we had that to do.

Senator HANNA. You say a little place. What do you mean by a little place?

Mr. TRUNDLE. I mean a short distance along the line of the canal.

Senator HANNA. How long?

Mr. TRUNDLE. I don't remember what it was, but probably 400 or 500 feet, something like that; I do not remember exactly what it was, but I don't think it was over that.

The CHAIRMAN. That was the suspected part?

Mr. TRUNDLE. Yes.

The CHAIRMAN. In order to avoid any difficulty from the canal running there over that place, you flattened the slope?

Mr. TRUNDLE. Yes.

The CHAIRMAN. So as to relieve that part of it from any very heavy head of water?

Mr. TRUNDLE. Not a heavy head of water, but a heavy weight of earth or of rock. If we had taken the slopes as we ordinarily take them through the earth, we would have had them vertical up to 5 feet above the proposed surface of the canal, and then had a berme and then had in hard rock a steep slope up to the top of the hard rock and then a flatter slope in the soft rock and then a still flatter slope in the earth, but that, you see, would have left a considerable mass of material that would have brought undue pressure on the earth below; but we considered, as far as determining our slopes were concerned, that all that rock was clay and made a slope that would stand that weight, all clay.

The CHAIRMAN. Just as if it had not been rock?

Mr. TRUNDLE. Yes.

The CHAIRMAN. So that in passing through such an area as that at the same depth of cut across a bed of clay, you would have depressed the cuts?

Mr. TRUNDLE. Yes.

The CHAIRMAN. So as to make the results that you finally arrived at?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Now, was that considered a safe place for the canal?

Mr. TRUNDLE. Well, as soon as I discovered it in looking over the boring records I brought the matter up to the Commission and discussed it, and some I think thought that a cheaper mode of construction, that is, to put in a retaining wall, would do, but I was anxious and I

think the Commission was anxious to have the thing so that they knew it would do, and this other way they felt sure would be a way to do it and they adopted that plan.

The CHAIRMAN. Now, was there any other place like that in that line as far as your jurisdiction went?

Mr. TRUNDLE. No; there is no other place where we strike anything like that.

The CHAIRMAN. Was this particular spot above or below the borings at Boca San Carlos?

Mr. TRUNDLE. Below Boca San Carlos; it was between Lock No. 4 and Boca San Carlos.

The CHAIRMAN. So that would have been included in what we call the Walker survey, would it not?

Mr. TRUNDLE. Well, it would not, for this reason: Just in there between what is now our Lock No. 4 and Boca San Carlos, we did not adopt the Walker survey, for the reason that it was too close to the river; we went back into the hills. We were a little afraid of it—and thought it would be a good deal safer, although we got some heavy cutting in putting the line back.

The CHAIRMAN. So that what we call the Walker survey did not pass through this suspected piece of ground?

Mr. TRUNDLE. No; it did not, and in the Walker survey we would not have known if it had.

Senator HANNA. I would like to ask one or two questions at this point. I will not be able to be at the adjourned meeting this afternoon.

The CHAIRMAN. Certainly.

Senator HANNA. In your connection with the Isthmian Canal survey you were an assistant engineer?

Mr. TRUNDLE. No; I was entitled "division engineer."

Senator HANNA. And you reported to the Commission?

Mr. TRUNDLE. Well, I reported to the chief engineer in Nicaragua, and when I came back here to work on the estimates I reported direct to the Commission.

Senator HANNA. So that what information you are giving us here to-day was furnished to the Commission through the proper channels of work and it was before them when they made up their minds with reference to their report?

Mr. TRUNDLE. Yes.

The CHAIRMAN. All this information they had from you that you are giving us and it is in their report?

Mr. TRUNDLE. Yes.

Senator HANNA. So that we are confined exclusively to this division that you have talked about to-day and the harbor?

Mr. TRUNDLE. Well, it was not, as far as my work in Washington was concerned.

Senator HANNA. I am not talking about that; I am talking about your work on the isthmus. Did you do any work on the Panama route?

Mr. TRUNDLE. No, I never saw the Panama route.

Senator HANNA. That is all I care for.

Senator KITTREDGE. Your work extended up to the first lock?

Mr. TRUNDLE. Oh, no; my work extended up to the mouth of the San Carlos River, which is above the fourth lock.

Senator KITTREDGE. How many miles is that from Greytown?

Mr. TRUNDLE. My work extended just about 43½ miles up the canal line from the 6-fathom line.

Senator KITTREDGE. How far is that from the dam that is proposed to be constructed on the route, the Conchuda dam?

Mr. TRUNDLE. Well, if you take it opposite the point on the canal survey as a base line it is only about a mile and a half, but as you go up the river it would be considerably more than that.

The CHAIRMAN. Did you locate this line between Greytown and Boca San Carlos?

Mr. TRUNDLE. Yes.

The CHAIRMAN. You mean the actual location of the line?

Mr. TRUNDLE. Yes.

The CHAIRMAN. It was your work?

Mr. TRUNDLE. Yes.

Senator HANNA. In that connection you used the previous surveys for what they were worth to you?

Mr. TRUNDLE. Yes; but we did not use the previous surveys without verification of them.

Senator HANNA. I understand that perfectly. But they were of assistance to you in locating your own lines?

Mr. TRUNDLE. Yes.

Senator HANNA. That is, you profited by all that was good and discarded all that was bad?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And the Commission adopted your location?

Mr. TRUNDLE. Yes.

The subcommittee then, at 11.40 a. m., took a recess until 3 o'clock p. m.

WASHINGTON, D. C., *Thursday, February 27, 1902.*

The subcommittee met at 3 o'clock p. m.

Present: Senators Morgan (chairman) and Kittredge; also Senator Millard, a member of the committee.

ADDITIONAL STATEMENT OF MR. H. H. TRUNDLE.

The CHAIRMAN. When you first went through the country between Greytown and the mouth of the San Carlos River did you find any paths or roads or openings cut through there that you could take?

Mr. TRUNDLE. There was a party sent ahead under Mr. Davis, who had been down there before, and they cut out paths and built camps, and there were some of the old paths visible. We could see that they were there along the line, and there were various places, for instance, over the divide, where the line had been cleared out for some distance.

The CHAIRMAN. I am speaking about the low levels.

Mr. TRUNDLE. Oh, no.

The CHAIRMAN. You found no paths through that part of the country?

Mr. TRUNDLE. No.

The CHAIRMAN. Is the country much obstructed with growths?

Mr. TRUNDLE. Yes; the growth is very thick in places. It is

impracticable to walk through the country without having a machete, and it is a good deal better to have somebody with you to cut your way through.

The CHAIRMAN. How often have you been over those streams and morasses between Greytown and Boca San Carlos?

Mr. TRUNDLE. I do not know, sir; hundreds of times, I suppose, over parts of them.

The CHAIRMAN. Have you been entirely through all of them?

Mr. TRUNDLE. I have been over all of them, I think.

The CHAIRMAN. I mean on the continuous line?

Mr. TRUNDLE. Yes; I think I have been over every foot of the location. No; I have not, either. There are about 2 miles near the coast at Greytown that I did not go over.

The CHAIRMAN. That was an open country, close to Greytown, was it not?

Mr. TRUNDLE. It was a comparatively good country.

The CHAIRMAN. When you made these surveys, did you just take everything as it came—go right through the swamps and marshes?

Mr. TRUNDLE. Yes.

The CHAIRMAN. How deep did you find the water in places?

Mr. TRUNDLE. Sometimes we were walking and sometimes we were swimming; that is, for a short distance we would get into places that looked about like the balance of it, but for some reason or other there was a hole or something there and we would step down into those holes. As a general rule, though, when we were in a swamp, it would be about half knee deep, or something like that. It was only in the vicinity of the lagoons that we struck these deep places.

The CHAIRMAN. As you came to these deep places, or these marshes, would you sound them to see what the bottom was?

Mr. TRUNDLE. We did finally, on the location.

The CHAIRMAN. I mean on the location.

Mr. TRUNDLE. Oh, yes; we sounded. Levels were taken with a rod, and then there were borings sunk at all sorts of places.

The CHAIRMAN. In every place where you supposed there was any want of firmness in the bottom, or any depth, you put your augers down?

Mr. TRUNDLE. We put enough down so that we could feel reasonably sure of everything that was there. We attempted to.

The CHAIRMAN. And you located the canal right through those places?

Mr. TRUNDLE. Yes.

The CHAIRMAN. How did you expect to get rid of the water that was on those marshes?

Mr. TRUNDLE. As a rule where those marshes were it was dredgable material, and the water was rather an advantage than a disadvantage for construction.

The CHAIRMAN. Well, the water standing upon the surface there in such quantities, and for so long a time, would indicate that there was a firm bottom beneath, would it not?

Mr. TRUNDLE. Yes; it would seem so, but you must take into consideration the fact that there is nearly always a supply to that surface water. It is raining a great deal.

The CHAIRMAN. Did that water seem to come from the rainfall or from washings from the overflow of running streams?

Mr. TRUNDLE. Oh well, it all came from rainfall, of course. It was not as a rule muddy, and the streams were not as a rule muddy. Some of them would be black and discolored.

The CHAIRMAN. By vegetable matter?

Mr. TRUNDLE. By vegetable matter.

The CHAIRMAN. And I understood you to say that you found a uniform geological structure, what you call sand, under the bottom of all that territory in there between the hills and Greytown.

Mr. TRUNDLE. Yes.

The CHAIRMAN. And it corresponded with that which had been taken out of this canal of the Maritime Canal Company and put upon the railroad?

Mr. TRUNDLE. Yes; it looked very much the same stuff, as far as I could judge at all. We took borings, and after being bottled up and fixed up they showed it to be about the same.

The CHAIRMAN. How did that compare with the country in Florida through which you made the survey of which you have been speaking?

Mr. TRUNDLE. Well, in Florida I think the swamps, as a rule, were not so deep; that is, a great deal of the country in Florida. The line that I ran was west from about Rockledge, over about 30 or 35 miles, and then south. I struck some apparently very deep swamps, so deep that I could take the ordinary rod that an engineer corps has and push it right down and did not strike anything indicating that I had gotten through the vegetable matter.

The CHAIRMAN. Would you think it any more difficult to construct a canal through that portion of Florida where you were than at Greytown?

Mr. TRUNDLE. No; I do not know that it would be any more difficult to construct. I notice one difference, though, that while I was in Florida I employed most of my men to help me there, and none of them would last more than a month or two. They would get sick or something and leave. One that I took down from here was sick there and had to leave, quite sick, and in Nicaragua we had very little sickness either among the natives or the men that we took from the States.

The CHAIRMAN. In the first survey you made for Admiral Walker's Commission, or the Nicaraguan Canal Commission, about how many men, officers and employees of every kind, were under your charge?

Mr. TRUNDLE. Well, my party numbered about 6 or 7, and I had about 20 or 30 laborers, depending upon the country that I was going through.

The CHAIRMAN. How long were you engaged in the field there?

Mr. TRUNDLE. I think I was in the field about ten and a half months.

The CHAIRMAN. Ten and a half months consecutively, straight along?

Mr. TRUNDLE. Yes.

The CHAIRMAN. What was the health of your party on that occasion?

Mr. TRUNDLE. I think I had one man at the hospital for a week or ten days, one officer, and then all of us, I think, had a day or two of sickness occasionally. I was sick three times, I think, but not sick enough to leave camp; and I would only stay in camp while I had fever, and then go ahead on the work. Among the laborers there was practically no sickness other than a few machete cuts that caused them a good deal of trouble.

The CHAIRMAN. Did you and your men take the water as it came?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And the swamps as they presented themselves?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And went right through them?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Cutting your way with machetes?

Mr. TRUNDLE. Yes.

The CHAIRMAN. On the second occasion you had a larger party?

Mr. TRUNDLE. Yes; I had four engineer parties, each about the same size as my other party—four engineer parties of about six or seven men, and then each of those parties had from fifteen to twenty-five laborers.

The CHAIRMAN. How long were you in the field with those men?

Mr. TRUNDLE. Very nearly a year; more than eleven months, I think.

The CHAIRMAN. Consecutive work?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Every day?

Mr. TRUNDLE. Yes.

The CHAIRMAN. That was the Isthmian Canal Commission work that you were doing then?

Mr. TRUNDLE. Yes.

The CHAIRMAN. What was the health of your party then?

Mr. TRUNDLE. Well, the health was good. I had one or two men in the hospital two or three times for a few days. One man was quite sick. That is, he had some of the fever that they have down there, and he was pretty sick, but I don't remember how long he was in the hospital. I do not think he was there over ten days, if as long, and then he went out on the work again.

The CHAIRMAN. That was the only real sick man you had?

Mr. TRUNDLE. That was the sickest I had, and he was at no time dangerously ill.

The CHAIRMAN. What was the general health of your party?

Mr. TRUNDLE. Oh, it was good. It was better than I would expect anywhere that I have ever been in the States where I had as much swamp to contend with.

The CHAIRMAN. Was it as good as the health of your people when you were in Florida?

Mr. TRUNDLE. It was better.

The CHAIRMAN. Did you drink the water of the country as you came to it or did you have a particular supply of water?

Mr. TRUNDLE. Well, I tried to have the water all boiled for drinking water in the camps, and I thought that I was succeeding pretty well; but since I have gotten back I have found out that I did not succeed quite so well as I thought. I attributed the health largely to the fact that the water was boiled, and I was speaking of it afterwards to some of the men and they have told me since that they always kept the boiled water but they seldom drank it. I think all of them drank the water pretty much as we came to it. A good many of them used the water vine, and drank water from that.

The CHAIRMAN. There is a vine there that yields water?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Gives about a pint as you cut it?

Mr. TRUNDLE. Yes; you cut off about 3 feet of it.

The CHAIRMAN. What is the health of the natives in that part of the country who were employed by you?

Mr. TRUNDLE. They seemed to be healthy. They never lost much time, other than when they would get a chance to go to Greytown and get drunk, or something like that.

The CHAIRMAN. Are they good laborers?

Mr. TRUNDLE. Well, they are good in a certain way. They are not stout enough for very heavy labor in anything except packing. They can pack pretty big burdens; they do not seem to show any skill in the use of a shovel or in anything like that in fixing up camps. They do not know anything about it; they might learn; they are pretty bright.

The CHAIRMAN. In that country, between the mouth of the San Carlos and Greytown, were there any settlements of natives?

Mr. TRUNDLE. Only occasionally; at occasional places along the river where there would be a little plantation about an acre square and a little hut where someone had settled.

The CHAIRMAN. On the San Juan River?

Mr. TRUNDLE. Yes; along the San Juan River and along the San Juanillo River. Back in the country there were none that I know of.

The CHAIRMAN. I believe you stated that you made the location of the canal at the place that the Isthmian Canal Commission adopted.

Mr. TRUNDLE. Yes.

The CHAIRMAN. When was that location adopted? After you got back or while you were there?

Mr. TRUNDLE. Well, I think part of it was adopted when the Commission visited Nicaragua and part of it afterwards. At the time the Commission visited Nicaragua I had put the Nicaraguan Canal Commission's location on the ground. Theirs was only a paper location before. The Commission had some consultation, advised some alterations in the line.

The CHAIRMAN. You took the Walker survey—that is, the Nicaragua Commission survey?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And put it on the ground?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Through the whole extent of your division there?

Mr. TRUNDLE. Yes.

The CHAIRMAN. And then you took that as the basis, to which you made the final location conform?

Mr. TRUNDLE. Yes.

The CHAIRMAN. As to the changes that were made in the Walker line, were the commissioners consulted?

Mr. TRUNDLE. Yes; all the principal changes. For instance, I had run in the final location across the Tambercito ridge when they were there, and submitted it for their approval. After they left I made a change in the location back of the Serapiqui ridge, but they were consulted about that in this way: Each month I would make a monthly report, and that was sent up here with the maps to the Commission for their approval.

The CHAIRMAN. Those two ridges you speak of—the Serapiqui and the Tambercito—are on the left bank of the San Juan River, are they not?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Why do you call them by these names, when those places are on the other side of the river, on the right bank?

Mr. TRUNDLE. Well, they are not on the other side.

The CHAIRMAN. I mean the Serapiqui Creek.

Mr. TRUNDLE. Well, it is the Serapiqui ridge. It is just opposite the Serapiqui River. They call it the Serapiqui ridge in just the same way that they speak of the Tambercito ridge.

The CHAIRMAN. Does that Tambercito ridge cross the river?

Mr. TRUNDLE. There are hills opposite there.

The CHAIRMAN. So that the same geological structure runs under the river and then crosses the hills on the other side at Tambercito?

Mr. TRUNDLE. Well, possibly, but it must be very much broken up. For instance, the general direction of the Tambercito ridge on the north side of the river is pretty nearly perpendicular to the general direction of the river at that point, whereas the hills that crop out on the other side seem to run more nearly parallel, and that country is very much broken up. Now, it may be that the general ridge line does continue through. I do not know. I have never been back in that country enough to know.

The CHAIRMAN. You made no borings across what we call the Tambercito ridge in the San Juan River?

Mr. TRUNDLE. Not in the San Juan River—we did not make any borings this time. The other Commission made one or two borings along there.

The CHAIRMAN. The Walker Commission?

Mr. TRUNDLE. Yes.

The CHAIRMAN. In your visits to Nicaragua, during the time you stayed there did you go across to Brito?

Mr. TRUNDLE. No, sir.

The CHAIRMAN. How far did you go up in that direction?

Mr. TRUNDLE. I only went to Castillo.

The CHAIRMAN. Did you see any signs of very heavy floods in the San Juan River between San Carlos and Castillo?

Mr. TRUNDLE. No, sir; I have never seen anything that looked like heavy floods; that is, I have seen the river get pretty full, pretty nearly up to the banks, and it must have some time have gotten over the banks, I suppose, but I have never seen anything in the sense of a flood, or the high water that I have seen here in the Potomac River; I mean at times, when it gets away up in the trees.

The CHAIRMAN. You never have seen anything of that kind there?

Mr. TRUNDLE. No, sir; and no indication of it.

The CHAIRMAN. Did you assist in making any borings at some location that was called the San Carlos dam?

Mr. TRUNDLE. The San Carlos dam-site investigation was under my direction, and the boring parties were under the superintendence of a superintendent of borings. I would instruct him, and was there quite a good deal when they were making the borings.

The CHAIRMAN. On both Commissions?

Mr. TRUNDLE. On this Commission. The borings under the other commission were made after I left Nicaragua the other time.

The CHAIRMAN. That is, the Walker Commission?

Mr. TRUNDLE. Yes.

The CHAIRMAN. When you got back there you found those borings, I suppose?

Mr. TRUNDLE. Yes.

The CHAIRMAN. You knew what they were?

Mr. TRUNDLE. Yes. I used the results of those borings in designing the Boca San Carlos dam for the other Commission.

The CHAIRMAN. Then you put in other borings?

Mr. TRUNDLE. Yes; quite a number.

The CHAIRMAN. Many of them?

Mr. TRUNDLE. Yes; we put in, I think, as I remember it, under this Commission, borings numbering between fifty and sixty.

The CHAIRMAN. What is the length of the line?

Mr. TRUNDLE. In about 2,000 feet.

The CHAIRMAN. Fifty or sixty in 2,000 feet?

Mr. TRUNDLE. Yes.

The CHAIRMAN. So that you ascertained to your satisfaction as an engineer exactly what the bottom was?

Mr. TRUNDLE. Yes; the general scheme for the borings was this: There were three lines of borings, one line in the center, and borings 100 feet to the right and 100 feet to the left, and they were about 100 feet apart. The outside borings were not always 100 feet, but might be 200 feet apart in those places where the rock surface was running regularly.

The CHAIRMAN. What were the deepest borings you found at the site of the dam at Boca San Carlos?

Mr. TRUNDLE. As I remember it the deepest place was about elevation minus 40 or something near it.

The CHAIRMAN. What was the character of the rock?

Mr. TRUNDLE. There were several characters of rock. The most of it, when we got to the hard rock, was black basalt; but in approaching that soft rock we struck different sorts of rock. There were some that felt something like steatite, but it was not. At least, it is said that it was not.

The CHAIRMAN. Was there any dissatisfaction amongst the engineers or the Commissioners down there—the last party that went there—as to the extent of the borings that had been made at the San Carlos to determine whether it was practicable to put a dam in there or not?

Mr. TRUNDLE. No; I think not. I think everyone thought they knew all that it was necessary to know—knew what the conditions were at San Carlos.

The CHAIRMAN. And did they determine that the dam was practicable?

Mr. TRUNDLE. Practicable to build a dam at San Carlos?

The CHAIRMAN. Yes; at that place.

Mr. TRUNDLE. Well, it was practicable; but when the Commission came down there I had practically finished with the borings on that site, and since they had gone lower than we had expected, from the limited number of borings we had had under the other Commission, very much lower, I suggested to them that we had better try some other point, or that we had better give up a masonry dam at that place, if they wanted to use that place.

The CHAIRMAN. Give up a masonry dam?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Well, was that in the dead water, the Agua Muertes?

Mr. TRUNDLE. Yes; practically. The Agua Muertes really seems to end a little above where the dam was.

The CHAIRMAN. Was there any current in the river perceptible?

Mr. TRUNDLE. Not much current there; very little. I guess you would consider the Agua Muertes to extend down to the mouth of the San Carlos River.

The CHAIRMAN. How far was this above the mouth of the San Carlos River.

Mr. TRUNDLE. I think half or three-quarters of a mile.

The CHAIRMAN. Just above the island there?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Did it include the point of the island?

Mr. TRUNDLE. Oh, no.

The CHAIRMAN. It was above that?

Mr. TRUNDLE. The island, you know, is just opposite the mouth, or a little bit below it.

The CHAIRMAN. It was above that?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Did you have anything to do with the borings at Conchuda?

Mr. TRUNDLE. No; I did not have anything to do with that. I went up there with the Commission.

The CHAIRMAN. But the reason for moving up the river was to get to a point where the rock was nearer the surface?

Mr. TRUNDLE. Yes.

The CHAIRMAN. Was this measurement you spoke of below the surface of the river or below sea level?

Mr. TRUNDLE. That was sea-level elevation I was trying to get. I am not positive about that, though. It has been some time since I have looked at it.

The CHAIRMAN. On the part of the canal with which you are familiar, and very familiar, do you now say that there is any difficulty in the way of completing that canal, that renders it in any sense impracticable or unfeasible?

Mr. TRUNDLE. No, sir; I do not know of a thing. I think it is perfectly practicable and feasible.

The CHAIRMAN. I do not think I have any further questions, unless you have something you want to state, Mr. Trundle.

Mr. TRUNDLE. Well, I do not know that there is anything particular that I want to state except that at the beginning of the questioning you asked me about the relative quantities. I do not know whether you have seen an estimate made up in this way or not, but when we think of the Nicaragua route as containing such a large amount of material, I think we are apt to forget the fact that so much of it is very cheap material to move.

The CHAIRMAN. The dredging part of it?

Mr. TRUNDLE. Yes; there is 114,000,000 yards of dredging and only about 30,000,000 of rock; that is, hard and soft rock together.

Then the healthfulness of the country surprised me very much when I first went there. I thought probably it would be unhealthful, but I found it quite the contrary?

The CHAIRMAN. Found it which way?

Mr. TRUNDLE. Found it very healthful for a tropical country.

Another big advantage to the canal, I think, is the fact that there is nobody on the line. You can go in there and make your sanitary regulations just what you would have them, and you will have nobody to deal with, practically, except the people you take there to do the work.

Senator KITTREDGE. Is that true beyond the part of the line which you had in charge?

Mr. TRUNDLE. Yes; that is true everywhere. There are a few small towns; Castillo, for instance—that has a few people; I do not know how many it has, but it is very small.

Senator KITTREDGE. Have you been over the western division?

Mr. TRUNDLE. I worked the estimate on the western division, but I have not been over the ground there.

Senator KITTREDGE. There are practically no people on that?

Mr. TRUNDLE. Practically no people there. There are some few people at San Carlos, just on the east coast of the lake.

Senator KITTREDGE. What do you mean by some few people?

Mr. TRUNDLE. I mean that there is a small town there at Fort San Carlos.

The CHAIRMAN. You are speaking about the eastern side now, are you?

Mr. TRUNDLE. Yes; and on the west side there are none. There is no town of any consequence, on the canal route west of Lake Nicaragua.

Senator KITTREDGE. How large is San Carlos?

Mr. TRUNDLE. I really do not know, but I think there are only a few hundred people; probably 200.

Senator KITTREDGE. Is that larger than any town on the western division?

Mr. TRUNDLE. Yes; I think it is other than San Juan del Sur.

The CHAIRMAN. That is not on the canal line, is it?

Mr. TRUNDLE. No; it is a few miles off the canal line, but it would possibly be a point that may be used, on account of the harbor that they have there. By running a spur track up to Brito you could get at work on the west divide cut very much quicker than in any other way, without building a temporary harbor at that place, and I expect that, in the event of building the canal, a large part of the material for construction plant would come in that way.

They would only have 18 miles of railroad to build between the Pacific and the lake, and could easily get transportation across the lake for the plant, and probably work a good distance down the river with the material that would come in from that side; especially does that seem to be the case, since it is estimated that the west divide cut will require a longer time than any other single feature of the work. And if that is the case, it would seem a good thing to get at the west divide cut as soon as practicable, and it is very practicable and easy to get at this cut by building 18 miles of railroad. I do not know what the distance is from the canal down to San Juan del Sur. I think it is about 4 miles.

Senator KITTREDGE. What is the heaviest work on the eastern division?

Mr. TRUNDLE. The heaviest work or the deepest cutting is at Tambercito, in the Tambercito Ridge. That cut extends 3,000 feet along the center line from the swamp on one side of the cut to the swamp on the other side, and I think at the summit, which is just a point: the depth of cutting is between 290 and 300 feet—I think 297 feet.

The CHAIRMAN. That is through rock?

Mr. TRUNDLE. Yes.

Senator KITTREDGE. Solid rock?

Mr. TRUNDLE. From a very short distance down. A very short distance down you strike rock, and then it is very uniform. The boring showed it to be a heavy rock, and it will be useful in the event of construction.

The CHAIRMAN. Good, strong rock?

Mr. TRUNDLE. Yes, it is strong and heavy. It is not stratified in any way of course, and for that reason would not be what we class as a building stone, but it would make excellent concrete.

Senator KITTREDGE. Could be used in concrete but not in locks?

Mr. TRUNDLE. Well, as the locks are designed they use very little cut stone in them. The bulk of them will be concrete.

The CHAIRMAN. The locks are made of concrete?

Mr. TRUNDLE. Yes.

The subcommittee (at 4.40 p. m.) adjourned, subject to the call of the chairman.

STATEMENT

OF

DR. JOHN FRANCIS BRANSFORD

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Friday, February 21, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present, Senators Morgan (chairman), Hanna, and Foster of Louisiana.

Also Senators Hawley, Kittredge, and Millard, members of the committee.

STATEMENT OF DR. JOHN FRANCIS BRANSFORD.

Dr. John Francis Bransford appeared and was duly sworn by the chairman.

The CHAIRMAN. Please give your full name, doctor.

Dr. BRANSFORD. John Francis Bransford.

The CHAIRMAN. You are a retired naval officer?

Dr. BRANSFORD. Yes.

The CHAIRMAN. What was your position in the Navy?

Dr. BRANSFORD. Surgeon, sir.

The CHAIRMAN. Have you ever visited the Isthmus of Panama?

Dr. BRANSFORD. Yes, several times.

The CHAIRMAN. And I include Nicaragua in the question.

Dr. BRANSFORD. Yes.

The CHAIRMAN. When did you first go there?

Dr. BRANSFORD. I went there in December, 1872.

The CHAIRMAN. In what capacity?

Dr. BRANSFORD. As medical officer of the Lull surveying expedition.

The CHAIRMAN. What time did you spend in each of those countries?

Dr. BRANSFORD. It was Nicaragua that I went to then. We landed at Greytown, in Nicaragua, on the 20th of December, if my memory is correct, and we stayed there until the 6th of July, 1873. Just before leaving there I made my first trip on the *Kansas* down to Panama and stayed there about a week, came back to Nicaragua and came home with the expedition.

The CHAIRMAN. You spent a week in Panama then?

Dr. BRANSFORD. About that, sir.

The CHAIRMAN. What was the size of the party of which Commander Lull was in charge?

Dr. BRANSFORD. There were 45 men ashore during the time. All of them were not ashore all the time. There were some coming and going. The average was 36 men.

The CHAIRMAN. Did his party consist entirely of naval men, men belonging to the ship?

Dr. BRANSFORD. No, there were one or two civilian engineers and employees, two or three, probably; I do not remember exactly.

The CHAIRMAN. Who were they?

Dr. BRANSFORD. Rodsmen and men of that sort.

The CHAIRMAN. Who was the chief engineer of Lull's expedition?

Dr. BRANSFORD. Mr. Menocal, and there was an engineer by the name of Crowell from Philadelphia, who was there also as an assistant.

The CHAIRMAN. Did you go ashore and remain ashore with the engineering party?

Mr. BRANSFORD. Yes; I was the medical officer of the surveying party.

The CHAIRMAN. That was the occasion when Lull made the survey of both routes, was it not, through Panama and also through Nicaragua?

Dr. BRANSFORD. I also went on another survey in 1875, with Captain Lull, when he surveyed the Panama route.

The CHAIRMAN. That was a separate survey?

Dr. BRANSFORD. Yes.

The CHAIRMAN. He made the Nicaragua survey first?

Dr. BRANSFORD. The Nicaragua survey first.

The CHAIRMAN. And then went to Panama?

Dr. BRANSFORD. Two years afterwards he went down and made the Panama survey.

The CHAIRMAN. Was he under the orders of the Government of the United States in making those surveys?

Dr. BRANSFORD. Yes; I was an assistant surgeon, and went as medical officer of both those surveys.

The CHAIRMAN. I will ask you to take up the Nicaragua line first; and I want to ask you in regard to the health of the country, the health of your party, and such facts as will give the committee a fair and just idea of what was the condition of the health of Nicaragua as affected by the climate or by any other consideration that you studied?

Dr. BRANSFORD. I had only two serious cases of illness among those men during that survey.

Senator KITTREDGE. How large a party was it?

Dr. BRANSFORD. Forty-five, first and last, but it averaged 36. There were only two serious cases of illness on that expedition. One was a lieutenant-commander, who had a sunstroke, and another was an old case of dysentery, which had existed before the man went there. We had a good many cases of malarial fever, none of a very serious character, except that they would recur. That is, a man would have a slight attack of chill and fever, and after he got well it would come back on him.

Senator HAWLEY. Did the complaints there take the form of diarrhea at all?

Dr. BRANSFORD. We were very free from any bowel trouble at all, sir, very. The bulk of my practice was with light cases of malarial fever. We were there from the 20th of December until the 6th of July, and, as I said before, there were only two serious cases. Of course, there was malarial fever in the swamps, particularly there in the neighborhood of Greytown; but I think that the country generally is about as healthy as any tropical country that I have known.

The CHAIRMAN. In your practice there as surgeon of that party did you keep up with the body of the engineers who were surveying—the workmen?

Dr. BRANSFORD. I lived in one camp or another. They were divided into several parties, and I would go from one party to another, according to the necessities of my profession. Sometimes I would be with one party and sometimes with the other, but I was in the field all the time with one or the other of the parties.

The CHAIRMAN. How did you travel through that country about Greytown?

Dr. BRANSFORD. In a boat.

The CHAIRMAN. What river did you take?

Dr. BRANSFORD. We were along the San Juan River.

The CHAIRMAN. You came up in boats along the San Juan?

Dr. BRANSFORD. Yes; our camps there were on the river bank. There was one camp after awhile on the lagoon back of Greytown, but the camps were usually on the bank of the river, and we traveled up and down in boats.

The CHAIRMAN. Did you make any observations of climatic conditions, as to winds and other things?

Dr. BRANSFORD. The prevailing wind there is the trade wind. It is right in the trade-wind belt, and that is the prevailing wind pretty much the year round. It was much stronger in the dry season than in the wet season, but it blows home. I think the *Ranger*, a few years afterwards, on the west coast, found that the wind was to the east, northeast, or southeast for two hundred and eighty three days during the year that she was there. That is the usual and prevailing wind. Occasionally in the wet season the wind hauled around to the southwest, and then heavy rains came.

The CHAIRMAN. Does that wind continue through the entire opening there up the San Juan River and the lakes and across to Brito?

Dr. BRANSFORD. All the way across the Pacific. It blows down in very heavy gusts on the Pacific side, which they call papagoyos down the gulches at San Juan del Sur and Brito. The winds are often very strong, and the wind reaches all the way across.

The divide in Nicaragua runs about northwest and southeast, right across the track of the trade winds. The trade wind usually is east-northeast, and the line of that canal from Greytown to Brito is very nearly east and west, a little bit northwest from Greytown, but so nearly east and west that the wind draws right through that gap, and, in my opinion, is the most important factor in the health conditions along that route.

Senator HANNA. At about what rate does the trade wind blow there, how many miles per hour?

Dr. BRANSFORD. I do not know, sir; I could not say; but it usually commences up to the northeast and blows very strong for two or three days, sometimes four or five days, and then moves down toward the east and dies out a little and then shifts back again. I know that when I was there in 1876 and 1877—I was also in Nicaragua on duty connected with the Smithsonian Institution—very often the winds blew so strong, when I was on the west side of the lake, that I would not be able to go to Ometepe Island, where I was at work, for two or three days at a time sometimes.

The CHAIRMAN. What did you say you were doing on these last two occasions?

Dr. BRANSFORD. I went down at the request of the Smithsonian Institution on special duty, alone, on exploring duty for the Smithsonian Institution.

The CHAIRMAN. What particular thing were you looking after?

Dr. BRANSFORD. Particularly archæology and the old Indian remains; and at the same time I did collecting in natural history, etc.

The CHAIRMAN. How long did you remain on these two latter visits?

Dr. BRANSFORD. I think I went down each time in January and stayed until June. I am not absolutely sure of it, but that was about the time, from January to June, in 1876 and also in 1877. Then in 1881 I was down there again for the Smithsonian Institution, in Guatemala, Nicaragua, and Costa Rica.

The CHAIRMAN. What particular duty were you on then?

Dr. BRANSFORD. The same duty, examining the remains of the Indian inhabitants.

The CHAIRMAN. Were you much over the country while you were down there?

Dr. BRANSFORD. All the time. I was in the interior.

The CHAIRMAN. What kind of country—agriculturally, topographically, and with reference to climatic considerations—is Nicaragua?

Dr. BRANSFORD. Well, conditions are entirely different on the two slopes. On the Atlantic slope it is heavily wooded, and there is a much heavier rainfall than on the Pacific. Most of the population is on the Pacific side of the main range of mountains. The country along the route of the canal from Lake Nicaragua to Brito is one of the finest agricultural countries I have ever seen. Rivas is the principal town. There are half a dozen smaller towns around it, and the whole of that country from the lake to the coast mountains, a distance of some 8 or 10 miles, is a garden spot for tropical fruits, chocolate, sugar cane, and fruits of all kinds.

The CHAIRMAN. What kind of a population has it, with reference to industry, quietude, and general disposition?

Dr. BRANSFORD. The ruling portion of the population is the usual mixture of Spanish and Indian. They are about like all the other South Americans. Some of them claim to be pure Spaniards, and from that they are everything down to pure Indian. They have the characteristics of the ordinary Spanish-Americans, being inclined to revolutions and so on; but the main body of the population is a very sturdy Indian people. I think they are very much stronger, more reliable, better men, than the mixed.

Senator HAWLEY. Well-behaved?

Dr. BRANSFORD. They are, sir, as far as my experience goes. They are very steady and good workers. When we wanted good, reliable men for work we always tried to get the pure Indians.

The CHAIRMAN. Doctor, while you were on these various visits to Nicaragua, I suppose you were a good deal on the San Juan River and in that vicinity?

Dr. BRANSFORD. Yes, sir.

The CHAIRMAN. Have you ever observed a flood in the San Juan River?

Dr. BRANSFORD. Nowhere above the mouth of the San Carlos. There are only two rivers of any consequence running into the San Juan River and they come from Costa Rica. One is the San Carlos and the other is the Serapiqui. I think one enters the San Juan River about 15 miles and the other about 25 miles from the mouth. I am not sure about my figures, because it has been a long time since I have paid any special attention to that.

The CHAIRMAN. How is it above San Carlos, between that and the lake? Are there any important streams in there?

Dr. BRANSFORD. None. They have some little rivers, but they are not enough to materially affect the main flow of the San Juan River.

The CHAIRMAN. In that part of the river between the mouth of the San Carlos and the lake, have you ever observed a flood in the San Juan River?

Dr. BRANSFORD. No, sir; the water is higher during the wet season, but it is not what I would call a flood. The rise and fall are very gradual, and are regulated by the height of the water in the lake, and any rise of that lake, which is a large lake, is very slow and gradual. It is high in the wet season, and the river is higher, but the change in level is very slow and not excessive.

The CHAIRMAN. Is it in any sense a torrential stream?

Dr. BRANSFORD. Not at all, sir.

The CHAIRMAN. Does it overflow its banks above the mouth of the San Carlos?

Dr. BRANSFORD. I have never seen it out of its banks.

The CHAIRMAN. Either in the wet season or in the dry?

Dr. BRANSFORD. No, I have been there until the 6th of July. I have not seen it out of its banks during the time I have been there.

The CHAIRMAN. What would be denominated the wet season in Nicaragua in the lake region?

Dr. BRANSFORD. In the middle of May the rains usually commence, and then if there comes a southwest wind it will rain very hard, sometimes for a week or ten days. That is about the heaviest rainfall, in the latter part of May and the month of June. Then there is some let-up in July. In August there is more rain again, and in September and October the rains die out and the dry season begins.

The CHAIRMAN. While you were in Nicaragua were you looking out for seismic disturbances?

Dr. BRANSFORD. I do not remember feeling an earthquake shock, except one slight shock.

The CHAIRMAN. Was that any part of your duty to investigate that?

Dr. BRANSFORD. In Costa Rica, in 1881, I felt quite a severe shock of earthquake.

The CHAIRMAN. In what part of Costa Rica was that?

Dr. BRANSFORD. It was at Punta Arenas, on the coast.

The CHAIRMAN. On the western coast?

Dr. BRANSFORD. Yes; it was not a shock that did any damage to anything, but it was a very sharp shock for a person who was not accustomed to it.

The CHAIRMAN. What I meant to ask you 'was whether it was any part of your purpose in the expedition you were conducting for the Smithsonian Institution to look out for these disturbances and make a record of them.

Dr. BRANSFORD. No, I had no special instructions in that regard, but I was expected to note anything that would be of scientific interest to the Smithsonian Institution.

The CHAIRMAN. Yours was a scientific inquiry on these occasions when you have been there through that region of country?

Dr. BRANSFORD. Yes, three times that way, and three times I went as medical officer of surveying parties; once in 1873, in Nicaragua; once in 1875, in Panama, and again in Nicaragua in 1885. I was sur-

geon on the *Hartford* on the South Pacific and was detached from it to join Mr. Menocal's survey of 1885, and then went back to the *Iroquis* afterwards.

The CHAIRMAN. For whom was that survey conducted in 1885? Was it for the Maritime Canal Company or was it for the United States?

Dr. BRANSFORD. I should say it was for the United States. I was detached from the *Hartford* and ordered there on duty, and it was conducted by naval officers altogether.

The CHAIRMAN. Was that the Lull survey?

Dr. BRANSFORD. No, that was the Menocal survey in 1885.

The CHAIRMAN. That was ordered by the Government and was later than the Lull survey?

Dr. BRANSFORD. Yes, that was conducted by Mr. Menocal, who was a civil engineer in the Navy, and Mr. Peary, who was also a civil engineer in the Navy.

The CHAIRMAN. Mr. Peary is the man who is exploring in Greenland now, in the Arctic?

Dr. BRANSFORD. Yes, and Mr. Chambers, who is now a lieutenant or a lieutenant commander in the Navy. He was an ensign at that time.

The CHAIRMAN. Those were under orders of the Government of the United States?

Dr. BRANSFORD. Yes.

The CHAIRMAN. For this service?

Dr. BRANSFORD. I was detached from the *Hartford* in Valparaiso and ordered up there by cable, and met them in Nicaragua and stayed with them until about the 1st of July. That was in January, I think, and then I returned to Panama and was transferred to the *Iroquois*, and stayed on her until my three years' cruise was up.

Senator HAWLEY. Who commanded the *Hartford* at that time?

Dr. BRANSFORD. Captain Carpenter, and later Captain Perkins.

The CHAIRMAN. Will you now describe your visits to Panama, when they were made, and under whose orders, and then proceed to state in the same line that you have in regard to Nicaragua, in regard to the health of the country, and its characteristics, physical features, and so forth?

Dr. BRANSFORD. My first visit to Panama was while we were in Nicaragua the first time. I went down there on the *Kansas* for about a week. That was in 1873. I was on the Lull survey in Panama during the spring of 1875, from the 14th of January, I believe, until April 4. Then the next time that I was in Panama was when I passed through there on my way to Nicaragua in 1876, and again in 1877.

In 1881 when I went to Guatemala I also passed through Panama going and coming. I was in Panama when I passed through to join the *Hartford* on the South Pacific, and visited Panama two or three times during that cruise. I do not remember exactly how many times.

The CHAIRMAN. Taking it altogether, then, you have been in Panama several times?

Dr. BRANSFORD. I came through there the last time in 1886, and I have not been in the West Indies any more, except during the Spanish war in 1898.

The CHAIRMAN. Was it any part of your duty to look after the health of your men while you were on either of these expeditions?

Dr. BRANSFORD. On all of them, except when I was alone.

The CHAIRMAN. Except when you were traveling alone?

Dr. BRANSFORD. Yes, sir.

The CHAIRMAN. About how many men were in the party with which you were associated on the first visit you made to Panama?

Dr. BRANSFORD. I think there were thirteen officers and rodmen, and so on, that we carried down there, and then we hired natives for laborers.

The CHAIRMAN. About how many on the second expedition?

Dr. BRANSFORD. Well, that was my only expedition to Panama.

The CHAIRMAN. Your only surveying expedition there?

Dr. BRANSFORD. Yes.

The CHAIRMAN. What length of time did you spend in Panama on that expedition?

Dr. BRANSFORD. Two and a half months.

The CHAIRMAN. What months were they?

Dr. BRANSFORD. February and March, the latter part of January, and a few days in April.

The CHAIRMAN. Was that in the rainy or the dry season?

Dr. BRANSFORD. That was in the dry season.

The CHAIRMAN. Who was the chief engineer of the party with whom you were?

Dr. BRANSFORD. Captain Lull was in command. Mr. Menocal was the chief engineer.

The CHAIRMAN. That was the first survey that Captain Lull made, was it not?

Dr. BRANSFORD. I think it was the first Government survey of the Panama route. There had been surveys of Darien and by the Atrato River, but I think that was the first survey of the Panama route.

Senator HANNA. What year was this?

Dr. BRANSFORD. In 1875, sir.

The CHAIRMAN. The first survey of the Panama route?

Dr. BRANSFORD. Yes.

The CHAIRMAN. What was the state of the health of that party during the time you were there? What was the matter with them, if anything?

Dr. BRANSFORD. The party there divided into two parties. One went up the Chagres River into the mountains from Matuchin, where the river comes down from the east and strikes the railroad. That was under Lieutenant Lutze. Another party was under command of Lieutenant Colby. That party went along the railroad line. The party that went up the river was the party I went with, because I expected to have trouble with that party on account of their camping on the river bank; but they had very good health. The party that went up the river from Matuchin had very good health. The party that stayed on the railroad line had three or four very severe cases of fever.

The CHAIRMAN. What kind of fever?

Dr. BRANSFORD. Malarial fever. The worst case we had was a case of congestive chill in a Jamaica negro who was acting as cook for us, and he died in spite of all I could do for him. Lieutenant Tausig had a very severe attack, but he recovered, and had no more trouble afterwards.

The CHAIRMAN. Well, I do not care about going into particulars of

these different persons who were sick. I just want to get a general idea of the healthfulness of that country.

Dr. BRANSFORD. I am quite sure the Isthmus of Panama is not a healthy country. That is the history of it, I think, always, everywhere. Up in the mountains of the interior it is all right; but along the Chagres River, and particularly along that Rio Grande which comes down near the line of the canal from the divide down to Panama, there is a great deal of mangrove swamp, and there is where we had our bad fever, where Mr. Tausig had his bad fever. That I consider a very unhealthy section. The trade wind does not blow home in the same way that it does in Nicaragua. The line of the Isthmus there is nearly east and west. Aspinwall is really west of Panama, and the trade winds are interfered with and deflected by the mountains east of Panama and the northern part of the State of Colombia, making a stagnation in the bay of Panama.

The CHAIRMAN. Did you visit Panama City while you were there?

Dr. BRANSFORD. Yes.

The CHAIRMAN. About what was the population of that place then?

Dr. BRANSFORD. I really do not know, sir.

The CHAIRMAN. What was the state of health in Panama City?

Dr. BRANSFORD. Well, the city of Panama itself is well located for such a section. It is built on rock, the sea washes around two sides or more than two sides of it, and there is the hill of Ancon that is between it and the swamps of the Rio Grande River, so that I think Panama, if it were properly handled, by proper sanitary measures and discipline, that the city itself would do well.

Senator HANNA. What do you mean by doing well?

Dr. BRANSFORD. I mean for the spot it is in.

Senator HANNA. Do you mean it would be a comparatively healthy city?

Dr. BRANSFORD. Not compared to other cities, but very much better than anywhere in its neighborhood. I think it is the best location that there is, except on some of those islands. I think the site of Panama is better than any point, except Matuchin, on the Panama Railroad.

The CHAIRMAN. What was the health at Colon?

Dr. BRANSFORD. The state of the health among the foreigners was very good. They got along very well, most of them, because they had their houses along the beach, and the trade winds kept them pretty well ventilated. There are swamps back of the town that were not managed well; but during the dry season there was a very nice trade-wind breeze, similar to that I mentioned at Nicaragua, which blows along the sea front at Aspinwall, or Colon. The breeze is not so steady as it is farther north, and there is more of the doldrum belt or the calm belt of the rainy season.

The CHAIRMAN. What was the state of health in Colon during the time you were visiting there?

Dr. BRANSFORD. Bad.

The CHAIRMAN. Was it very bad?

Dr. BRANSFORD. Well, I did no practicing in the village of Colon. When I say it was bad, I mean amongst the native population and the low classes who were living back away from the sea front. The foreigners who lived on the sea front during the dry season seemed to enjoy good health.

The CHAIRMAN. Did you find the yellow fever or the Chagres fever in that country.

Dr. BRANSFORD. Oh, that is the headquarters of the Chagres fever, and there has been yellow fever several times when I have been in Aspinwall.

The CHAIRMAN. Does the Chagres fever differ from the yellow fever?

Dr. BRANSFORD. The Chagres fever is simply the local malarial fever along that river. It is that which gives it its name.

The CHAIRMAN. Does it run into hæmaturia?

Dr. BRANSFORD. I have never seen a case of it.

The CHAIRMAN. Why is it called the Chagres fever?

Dr. BRANSFORD. From the locality, just as they call a similar fever on the other side the Panama fever; and in different parts of the Tropics they give the fever local names.

The CHAIRMAN. Do those fevers differ from each other as a distinctive difference, or is it simply the malarial fever that gets its name from the locality where it is found?

Dr. BRANSFORD. That is what it is, sir.

The CHAIRMAN. So that there is not a very distinctive difference in the characteristics of these fevers?

Dr. BRANSFORD. No, sir.

The CHAIRMAN. But yellow fever is different from either?

Dr. BRANSFORD. Altogether.

The CHAIRMAN. Altogether different?

Dr. BRANSFORD. Yes.

The CHAIRMAN. What is your opinion, as a physician, on the subject of the prevalence of yellow fever in the Isthmus of Panama, whether it is continuous, to be expected every year and at every season of the year, or not?

Dr. BRANSFORD. I think that in Panama cases of yellow fever are liable to occur at any time during the year.

The CHAIRMAN. How is it in regard to yellow fever in Nicaragua?

Dr. BRANSFORD. I have never seen any there.

The CHAIRMAN. Have you ever heard of a case of yellow fever in Nicaragua?

Dr. BRANSFORD. No, never. I never have heard of any case, never have been told of any case there. In fact, of my own knowledge, or as far as of any knowledge coming to me by any other person, I never knew of any case of yellow fever in Nicaragua. I remember some time reading, I think, that it had occurred at Greytown, but never to my knowledge, or at any time when I was there.

The CHAIRMAN. If you are going to treat on information from reading what would be the reputation of it?

Dr. BRANSFORD. Of my own knowledge I have never known any case in Nicaragua.

The CHAIRMAN. What would be the reputation of Panama from the medical sources?

Dr. BRANSFORD. Well, it is very bad, sir.

The CHAIRMAN. I suppose while you were in Nicaragua and Costa Rica both you looked out for the general condition or situation in regard to health, being a doctor?

Dr. BRANSFORD. Yes, sir.

The CHAIRMAN. Has your attention been drawn to that subject since that time, by reading or observation?

Dr. BRANSFORD. I have not been paying much attention to it for the last twelve years.

The CHAIRMAN. Have you made a study of it? That is what I want to get at.

Dr. BRANSFORD. No; not for the last twelve years. I have not been in practice for the last twelve years.

The CHAIRMAN. Were they at work on any railroad or the canal when you were there, on either of your visits to Panama?

Dr. BRANSFORD. The last time I came through there they were at work on the Panama Canal at Culebra.

The CHAIRMAN. They had been at work on it before, had they not?

Dr. BRANSFORD. Passing on the train I simply saw that they had been at work there, and I believe they were doing some work at that time. A good deal of machinery was along the route.

The CHAIRMAN. You were passing through?

Mr. BRANSFORD. I was just passing through on my way from South America.

The CHAIRMAN. You did not stop to make any investigation?

Dr. BRANSFORD. Not at all, sir.

The CHAIRMAN. I believe when you went there with the Lull party the railroad was built?

Dr. BRANSFORD. Oh, yes; the railroad was built in 1853 or 1854.

The CHAIRMAN. What was the reputation as to the number of men or the percentage of men who had been lost by disease or disabled by disease during the construction of that railroad?

Dr. BRANSFORD. Well, it was a common report that there had been heavy mortality on the construction force.

The CHAIRMAN. Was that report denied by anybody that you heard of?

Dr. BRANSFORD. Never that I have heard.

The CHAIRMAN. A heavy mortality while the railroad was being constructed?

Dr. BRANSFORD. Yes.

The CHAIRMAN. That is all I want to ask the doctor, gentlemen.

Senator HANNA. You spoke about yellow fever being prevalent at Panama. It has also been prevalent in Habana and Santiago de Cuba, has it not?

Dr. BRANSFORD. Yes.

Senator HANNA. Very severely?

Dr. BRANSFORD. Yes. If you will allow me, Senator, I may have used the word "prevalent," but what I meant was that cases were liable to occur at any time.

Senator HANNA. At any time of the year. I understood that. Well, after exercising proper sanitary methods in Habana and in other places in Cuba that trouble has been obviated very largely, has it not? Yellow fever has been reduced.

Dr. BRANSFORD. Yes.

Senator HANNA. The same thing applied in Panama would produce like results, would it not?

Dr. BRANSFORD. Well, it ought, as far as the yellow fever goes. I do not think anything will free the country of Panama fever.

STATEMENT
OF
GEORGE S. LEE
BEFORE THE
SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,
UNITED STATES SENATE,
CONSISTING OF
SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Tuesday, February 25, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman) and Hanna.

Also, Senators Hawley, Kittredge, and Millard, members of the committee.

Mr. George S. Lee appeared and was duly sworn by the chairman.

STATEMENT OF MR. GEORGE S. LEE.

The CHAIRMAN. Mr. Lee, what opportunities have you had to know anything about the Nicaragua Canal route or the Panama Canal route?

Mr. LEE. Well, I passed some weeks on the Isthmus of Panama in an early day.

Senator HANNA. How early? Please state the time.

Mr. LEE. In 1862; but my investigations were more particularly directed to the mineralogical features.

Senator HANNA. Are you connected with the Government?

Mr. LEE. No, sir.

Senator HANNA. Have you ever been connected with the Government?

Mr. LEE. No, sir; not at all.

The CHAIRMAN. What is your calling?

Mr. LEE. I am a mining engineer, a mining and locating engineer. Since 1858 I have been in that particular line in mining industries, mostly in Colorado, Idaho, Utah, and California; but in 1884, the year of the New Orleans Exposition, I was employed by a Colorado syndicate to investigate the conditions of a large concession in Honduras and Nicaragua. I was sent there for that purpose, to make a report upon the condition of affairs as they existed at that time. Necessarily that involved a traversing of the country to a large extent. Starting in Truxillo, in Honduras, I proceeded from there to Juticalpa and Tegucigalpa, the capital of Honduras, and from there practically in a parallel line with the coast.

My report was not such as to justify the parties who had invested there so heavily in continuing that enterprise, and I returned there again, being employed by another syndicate, to examine into the topographical features of the rivers, their headwaters, and the mineralogical conditions thereon, they emptying into the Caribbean Sea.

In pursuance of that mission, I took a schooner upon the coast, traversing the line of the Caribbean Sea from Truxillo toward Costa Rica to Port Limon, examining critically the general topography of the river formations as they came from the range. I believe that I

went up the Aguan, the Oleya, the Rio Negro, the Rio Suere. I do not know that I give them in the order in which they come. There were a number of others, the names of which, at this length of time, I can not recollect.

The CHAIRMAN. Did you go up the Chagres?

Mr. LEE. Oh, I have been up the Chagres. I am not now speaking of the Isthmus; I am speaking of the topographical conditions connected with the rivers as they appeared to me; those emptying into the Caribbean Sea.

The result of that seemed to be to some extent satisfactory, so much so that another trip was undertaken with the purpose of constructing a dam on the Yapi and Manguilela rivers.

The object of that dam was to mine the auriferous gravels contained in those rivers. For that purpose the intention was to construct a dam to run parallel with the river and through the center of the river; in other words, to split the river, to turn one part of it off to one side with a wing dam, and to work out the gravel beds lying below it, and when one side was worked out to throw the dam the other way, so as to uncover the other side and work that out.

Senator HANNA. For the purpose of mining for precious minerals?

Mr. LEE. Yes; entirely. All my investigations have been in that line.

During the progress of that, and soon after the work was commenced, the water line was established to my satisfaction in a very peculiar way, and so much so that I became convinced of the futility of doing what we had started to do, although we had money, means, and every facility at our command to carry on the enterprise there. Although I had the power to go on with it, I abandoned the enterprise entirely, as I believed it would have been an impossibility to have built a dam that would have taken care of the enormous overflow of water, which I could see from the conditions necessarily must have followed the course of that stream.

Senator HANNA. What stream?

Mr. LEE. The Yapi and Manguilela above their junction with the Patuca River.

Senator HANNA. Where is that?

Mr. LEE. Just above the Nicaragua line, in Honduras. Then simultaneously a revolution broke out, which is natural to that country. Marcus Aurelius Soto was being deposed from the presidency, and Bogran was his successor. The country being in such an unsettled state, and not desiring to become embroiled in that matter, after making a general topographical survey of the coast through to Port Limon, including Greytown, the enterprise was abandoned. Very fortunately we came out without any very serious loss.

The prior matter of which you spoke, as to the Isthmus of Panama, my knowledge of that is entirely confined to three or four weeks that I put in on the Isthmus of Panama in 1862, when I was engaged in looking at the same conditions geologically and mineralogically.

The CHAIRMAN. Did you at any time ascend the Chagres River?

Mr. LEE. Yes; I ascended it and came down it in 1862.

The CHAIRMAN. How far?

Mr. LEE. I crossed the Isthmus several times.

The CHAIRMAN. How far up the Chagres River were you in your investigation?

Mr. LEE. I crossed on the present line of the railroad.

The CHAIRMAN. Did not go up the Chagres above that?

Mr. LEE. No; at least I do not remember doing so.

The CHAIRMAN. Do you know anything about the country, for instance, between Panama and Gorgona?

Mr. LEE. I have been over the country.

The CHAIRMAN. What sort of a country is that?

Mr. LEE. Well, my recollection of it at the present time is crude, because it was not the topographical features that recommended themselves so much to me as my endeavor to reach certain points for prospecting. It was the prospecting line of effort that I was engaged in. You speak of Gorgona. I do not know exactly where that is.

The CHAIRMAN. There are several little villages there on the Chagres River. Gorgona is the old point from which the canoes started.

Mr. LEE. Where they ascended the Chagres River?

The CHAIRMAN. Yes. Now, on the watershed of the Chagres River what kind of a country did you find?

Mr. LEE. Of course, I could see at once the tremendous overflow of water that would come down that watershed and the tortuous condition of the river, and it appeared to me to be a very hazardous undertaking to connect a canal with the Chagres River, owing to the tremendous heights to which the water attains, which was afterwards explained by an examination of the rivers above.

Senator HANNA. Was there any talk at that time of building a canal on that route?

Mr. LEE. There was talk, yes, in California. There was general talk among the men who had to cross there backward and forward. At that time it was the only means of communication, except across the plains.

Senator HANNA. I asked whether there was any talk at that time about constructing a canal along this route adopted now by the Panama Canal Company.

Mr. LEE. Yes; in general terms.

Senator HANNA. I do not want general terms, I want specific terms.

Mr. LEE. No; not in specific terms.

Senator HANNA. Was the Panama route mentioned particularly as a contemplated route for constructing a canal?

Mr. LEE. Across the Isthmus of Panama, yes.

Senator HANNA. Was any other route mentioned?

Mr. LEE. Yes; the Nicaragua route was thought of.

Senator HANNA. That was back in 1862?

Mr. LEE. In 1862, yes.

Senator HANNA. During the war?

Mr. LEE. During the war.

Senator HANNA. Did you have in your mind during that trip in 1862 the question of studying the proposition of a canal?

Mr. LEE. No, sir; I did not.

Senator HANNA. You did not think of that?

Mr. LEE. No; it was mineralogical conditions entirely that I was thinking of.

Senator HANNA. So that you were not observing the conditions with reference to the construction of a canal?

Mr. LEE. No; only so far as dam construction and the difficulties of that part were concerned.

Senator HANNA. What interest have you in looking at the water question?

Mr. LEE. Well, we were looking at the gravel formations——

Senator HANNA. No, I mean with reference to a canal.

Mr. LEE. No; not with reference to a canal.

Senator HANNA. You had no interest in that?

Mr. LEE. No, sir.

The CHAIRMAN. You were thinking about dams for the purpose of mining?

Mr. LEE. That is right. It was a mining proposition. That was entirely uppermost in my mind.

The CHAIRMAN. Dredging out river beds, washing for gold?

Mr. LEE. Yes.

Senator MILLARD. As a mining engineer, have you had any experience in tunneling under mountains?

Mr. LEE. Yes.

Senator MILLARD. Tunnels of what length?

Mr. LEE. I could hardly answer that question, because there have been so many, and of such varied kinds.

Senator MILLARD. Does it make any difference in tunneling under a mountain, where you go 1, 2, or more miles, as to the height of the mountain above, provided it is properly arched or properly timbered?

Mr. LEE. No, sir; none whatever.

Senator MILLARD. The fact of a mountain being 500 feet or 5,000 feet above the tunnel makes no difference, as to the weight?

Mr. LEE. Not at all. The weight has nothing whatever to do with it, if it is a properly constructed tunnel.

Senator MILLARD. Suppose you wanted to construct a canal and it was necessary to tunnel under a mountain for 5 or 6 miles?

Mr. LEE. I should think it would be perfectly feasible.

Senator MILLARD. You would consider a tunneling proposition feasible?

Mr. LEE. Well, when once you get the opening through the rock, the removal of more rock becomes a matter of almost no moment whatever. While you are driving your tunnel in the first place you are hidebound, you are bound below, and at the sides, and at the top. As soon as that tunnel is open, you can back-stope and drop your rock away in benches, and the cost of construction in that case is reduced almost to a minimum. Before I left Colorado, in 1889, I was mining in the San Juan country for a number of years, near Silverton, Ouray, Lake City, and other places. In fact, I have always been in that character of work, engineering and mining. We paid for ordinary trachyte or trap rock in crosscuts, about \$5 a foot for a tunnel of the ordinary size, 5 feet by 6.

Senator MILLARD. Tunneling for a canal would be entirely different, because it would be so much larger.

Mr. LEE. Yes, it would have to be opened first and then back-stoped and benched. It would be a very simple matter to do so after it was once opened.

Senator MILLARD. You think it would be practicable as far as the tunnel was concerned?

Mr. LEE. Yes.

Senator MILLARD. No matter what the size of the tunnel might be?

Mr. LEE. Yes, in my opinion it would be not only feasible, but it

would be comparatively easy to construct after once an entrance was gained. In other words, it is cheaper to sink a shaft up than it is to sink it down.

Senator MILLARD. Where do you make your home?

Mr. LEE. Near Paterson, 18 miles from New York, 1 mile from Paterson.

Senator MILLARD. What is your present business?

Mr. LEE. Since the 1st of January, 1902, I have been in no business. I left Colorado in 1889, and have been engaged in mechanical business entirely since then, in machinery and kindred matters. I have been manufacturing automobile parts by machinery.

The CHAIRMAN. How much time did you spend in Panama altogether?

Mr. LEE. Between three and four weeks, below Panama and above, in the Cordilleras, and in reaching around to different points as a prospector naturally would.

The CHAIRMAN. Is the watershed of the Chagres steep where you saw it?

Mr. LEE. On this side it is not so steep, but it has a tremendous volume of water to carry.

The CHAIRMAN. How did you ascertain that fact?

Mr. LEE. From the way the water rises. I have seen the water rise there to a tremendous height myself.

The CHAIRMAN. About how high?

Mr. LEE. I have seen it go up 30 or 40 feet in a very short time.

The CHAIRMAN. Was it carrying silt?

Mr. LEE. Yes; carrying silt. All of those rivers do. In fact, they are filled with that everywhere along the line of the Caribbean Sea.

The CHAIRMAN. They are silt-bearing rivers?

Mr. LEE. Yes; the rivers bar themselves out 2 or 3 miles from the shore by the silt that is carried there by the deposition of the rivers.

The CHAIRMAN. What is the cause of that silting?

Mr. LEE. The erosive action of the rains falling upon the disintegrated rock, and the hot sun disintegrating it so rapidly.

The CHAIRMAN. The heat following the moisture?

Mr. LEE. The heat following the moisture, so that in places where we took gold from the ground one year, denuding the deposit entirely, the following season it would be replenished by erosive washing, and a deposit of more gold.

The CHAIRMAN. You are speaking of the general characteristics of the entire Isthmus?

Mr. LEE. Yes; of the entire country where the enormous rainfalls exist.

The CHAIRMAN. Is that country what we call a volcanic country—a basaltic country?

Mr. LEE. Well, I am looking back through a period of time that you gentlemen will recognize as a good many years. My impressions at the time I was on the Isthmus of Panama were that at one time there had been a connection between the two oceans.

The CHAIRMAN. At Panama?

Mr. LEE. Yes.

The CHAIRMAN. You are proceeding on the Chinese idea now.

Mr. LEE. I am speaking of theory now. This is theoretical and not facts.

The CHAIRMAN. The Chinese insisted that there was a connection between the two oceans there.

Mr. LEE. I have never heard that. I am very much at a disadvantage here, because my attention has been so thoroughly occupied in the past few years in mechanical problems that I have given no time or attention to this matter, and I am only dwelling practically in the researches of the past. I have not had even the opportunity to read and follow the course of events, and I am speaking of the facts as they appeared to me at that time.

The CHAIRMAN. That is what we want.

Mr. LEE. It appeared to me at that time, if my recollection serves me properly, that water communication must have existed between the east and the west coasts, or rather the north and south coasts, as the land runs there, or between the Atlantic and the Pacific, in other words. In other sections of the world I have seen a closing up between mountains, and it was patent to my mind either that the channel had been closed by volcanic action or that it had been closed by a sliding in or deposition of material. It did not appear to me at that time to have been an upheaval, but more like a gradual sliding in. The rock, if I remember correctly, is to a large extent igneous rock, porphyry and trachyte, volcanic rocks, which was more or less confirmatory of the theory I have in my mind.

The CHAIRMAN. If you should find that in a pit sunk in the dividing ridge and from the crest of the Culebra hill and that 50 feet below the surface sharks' teeth had been found, I suppose that would confirm your idea that there had been a seaway over that place.

Mr. LEE. I should not be at all astonished at that, for the reason that back of Santa Barbara I was called upon to examine a proposition there in asphalt, in the Canyon Diablo. The evidence there showed that the ground had evidently been lifted directly up from the bed of the ocean, tilted from a horizontal position, and from excavations made by me in a general way I found just what you state—sharks' teeth and vertebræ, remains of fishes; and, in fact, I have at present shells that were taken out. So it would not astonish me at all to find that condition of affairs there. I do not recollect the height at Culebra, but from my recollection it must be at least 250 or 300 feet above the level of the sea. And I think if you were to go down there 200 feet, or perhaps less, you will find evidences of marine life.

The CHAIRMAN. So that you regard the surface of the earth in Panama as being of volcanic origin.

Mr. LEE. My theory of it is that it has been at one time a causeway which has been filled either by volcanic action or by a gradual sliding in from each side.

The CHAIRMAN. The question I want to ask you is whether volcanic regions are subject to be washed away by rains, so that there is a deposit of silt in the beds of the running streams?

Mr. LEE. Yes, I think the erosive action in every river is very deeply marked.

The CHAIRMAN. In all that country?

Mr. LEE. In all the localities from Panama to Guatemala, and in every river I have ever examined I have found evidences of that to exist, and very largely so, very strongly marked.

The CHAIRMAN. All the rivers that come from the mountain range?

Mr. LEE. All the rivers that come from the mountain range and

debouch into the Caribbean Sea are of that nature; all carry large quantities of débris and silt.

WASHINGTON, D. C., *February 25, 1902.*

DEAR SIR: Thanking you for the privilege you kindly granted me to make additions to the report I had the honor to make to the board to-day, and such as might after suggest themselves to me, I respectfully submit the following:

First, That if the theoretical proposition submitted as to the existence of a former strait or causeway between the two oceans should be found hereafter to be correct, the contention that the banks of an artificially constructed causeway or canal would close in becomes an almost absolute certainty, as no substantial foundation could be available to embank upon or by artificial force created to prevent the gradual closing in of the canal sides even were they constructed at enormous and prohibitive widths. The underlying strata of clay indigenous to all the valleys, river banks, ravines, and watersheds in which I have prospected rapidly dissolved and disintegrated wherever exposed, and in contact with water are rendered fully as slippery and seamy as glaciers of ice. The bond or key being removed by cutting to the depths and widths needed for an isthmian canal, the sides could not be kept from slipping inward and closing in; hence natural rock construction must be found on one side at least to form a resting point or firm foundation by which artificially to hold back the other side.

Economy of maintenance means "as far as nature will allow" a canal in rock, and that rock itself to be in place and not slide or deposited rock. In my investigation of that feature of the isthmian rocks on the line of the Panama Railway, on the Rio Grande, the Obispo, or Chagres River, to the best of my recollection there was no semblance of primeval rock or character of rock in place. All that I saw I remember as deposited. As a constructing engineer called upon to undertake the excavation of, and especially the after maintenance of a waterway of the size contemplated and required, I would prefer, and on financial considerations solely, to excavate 3 miles of rock in place rather than the removal of clay for half the above distance, and guarantee its maintenance for even a short period against the erosive action of water upon the soluble clays, most especially those met with in Central and South American rivers and valleys. The same statement applies with even greater force to the necessity of meeting rock in place in the construction of artificial reservoirs by the damming of any Central American waterway with their excessive rises during the season of greatest rainfall.

I have the honor to submit this addenda with the report previously made.

Very respectfully, your obedient servant,

GEORGE S. LEE.

Hon. JOHN T. MORGAN,
Chairman Isthmian Canal Commission,
Washington, D. C.

STATEMENT

OF

H. H. DOUGHERTY

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Wednesday, February 26, 1902.*

The subcommittee met at 3 o'clock p. m.

Present: Senator Morgan (chairman).

Mr. H. H. Dougherty appeared, and was duly sworn by the chairman.

STATEMENT OF H. H. DOUGHERTY.

The CHAIRMAN. You are a railroad contractor?

Mr. DOUGHERTY. Yes, sir.

The CHAIRMAN. And an engineer?

Mr. DOUGHERTY. Yes, sir.

The CHAIRMAN. How long have you been in the work of engineering?

Mr. DOUGHERTY. About twenty-three years.

The CHAIRMAN. In what countries have you worked?

Mr. DOUGHERTY. In the United States, Canada, and in Peru, South America.

The CHAIRMAN. Have you had charge of any extensive works?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. What are they?

Mr. DOUGHERTY. The most extensive work that I had charge of was at Berrugas, Peru, South America.

The CHAIRMAN. Was that a heavy work?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. You were employed by the Government of Peru?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. While you were there I suppose you became acquainted with the conditions of labor in that part of the world?

Mr. DOUGHERTY. Yes; and I found it very poor labor—labor not to be depended upon.

The CHAIRMAN. When did you leave Peru?

Mr. DOUGHERTY. I left in February, 1891.

The CHAIRMAN. You came from where?

Mr. DOUGHERTY. I left Callao in February, 1891, and stopped at the different ports along the way and made a report on the condition of the railroads for Liberty & Sons, of London, England, engineers.

The CHAIRMAN. You made an examination of their railroad.

Mr. DOUGHERTY. Yes; of the Peruvian railroads.

The CHAIRMAN. For this firm in London?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. And you stopped along to examine those roads different ports?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. Did you go to Panama?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. On a steamer or a sailing ship?

Mr. DOUGHERTY. On a steamer.

The CHAIRMAN. How long did you stay at Panama?

Mr. DOUGHERTY. I stayed there about two days.

The CHAIRMAN. Then afterwards where did you go?

Mr. DOUGHERTY. I went to Colon, and my reason for going was that there was so much yellow fever in Panama that I was afraid to stay there.

The CHAIRMAN. Was it very bad?

Mr. DOUGHERTY. Yes, in 1891.

The CHAIRMAN. What month was that?

Mr. DOUGHERTY. Somewhere about the 10th or 5th of February, 1891.

The CHAIRMAN. How long did you stay at Colon?

Mr. DOUGHERTY. About thirty days.

The CHAIRMAN. What was the state of the health there?

Mr. DOUGHERTY. Better than at Panama. They had no fever at Colon at that time.

The CHAIRMAN. Did you pass back and forth across the Isthmus?

Mr. DOUGHERTY. Yes; crossed it three times.

The CHAIRMAN. In what way?

Mr. DOUGHERTY. Twice by rail and once by muleback.

The CHAIRMAN. On that muleback ride what course did you take, the course of the canal or of the railroad?

Mr. DOUGHERTY. I took a course as near to the canal as I possibly could.

The CHAIRMAN. What was your purpose in going through there?

Mr. DOUGHERTY. Simply for observation, and I had thirty days' time to wait until I could get a steamboat to New Orleans. I did not want to go back in the cold weather to New York by the Pacific Mail boat.

The CHAIRMAN. Were you a contractor in Peru?

Mr. DOUGHERTY. No; I was employed as an engineer.

The CHAIRMAN. Were you superintendent of the work?

Mr. DOUGHERTY. Had full charge of the work.

The CHAIRMAN. In passing across the Isthmus or along the line of the railroad and the canal—I suppose that was the line that you went by?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. You did not turn off and go across the ridges?

Mr. DOUGHERTY. No; I went the best route for a mule to travel.

The CHAIRMAN. Did you make close observation of what you saw, and was that your business in crossing there?

Mr. DOUGHERTY. Yes; my business was one thing, to kill time.

The CHAIRMAN. You had the time and you wanted to put it in in that way?

Mr. DOUGHERTY. Yes; and I was acquainted, had some letters of introduction given to me by different people in New York to people in Colon.

The CHAIRMAN. Who were those persons in New York?

Mr. DOUGHERTY. Abram S. Hewitt and William R. Grace. They gave me letters of introduction to people in Colon and also in Callao and Peru.

The CHAIRMAN. You were seeing these people and putting in your time looking over that country?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. As you came up the line of the canal on muleback at first did you make observation?

Mr. DOUGHERTY. First, I had heard so much about the houses that were built by De Lesseps and son that I went down to Aspinwall, or what was known as Colon, I guess now; it is a little bit below, about a mile and a half. This gentleman at Colon, whose name I can not recall just at this moment, said, "You ought to go down and look how much wine those people drank—see the empty bottles." And so I went down there, and at the rear of each one of the houses I should say there was a pile of wine bottles that would reach as high as the ordinary two-story house, and I thought that was a pretty good wine-time that they had anyhow. Then I went over to the statue of Columbus that they placed at the mouth of the canal and spent a day in walking round where they had been digging, and I found that a number of tugboats were lying in this basin, and the slopes had washed in on some of them—you could only see a few feet of the smokestacks sticking out of the mud.

The CHAIRMAN. About how many of those boats?

Mr. DOUGHERTY. I suppose about a half a dozen tugboats and several dredges.

The CHAIRMAN. Mired down?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. You mean that the banks had caved in on them?

Mr. DOUGHERTY. Yes, the banks had caved in on them; and I found several locomotives turned over on their sides, and also cars turned over, on account of the material washing out from underneath the ends of the ties and simply allowing them to roll over, and no care was taken of them.

The CHAIRMAN. How many of those were there?

Mr. DOUGHERTY. There was at least a dozen.

The CHAIRMAN. Was the canal company at work there then?

Mr. DOUGHERTY. No, sir.

The CHAIRMAN. Business was suspended?

Mr. DOUGHERTY. I did not see anybody at work at all.

The CHAIRMAN. Did you observe the condition of the channel of that canal and the banks of it to see in reference to whether it had fallen away or silted up?

Mr. DOUGHERTY. Yes, it had silted up considerably, and as I looked at it then I thought it would be a very sickly place, and under no consideration would I accept either a contract or a position as I looked on the sanitary condition at that time.

The CHAIRMAN. Did you notice the cemetery on Monkey Hill?

Mr. DOUGHERTY. Yes, I was up on Monkey Hill, and I saw, I suppose, hundreds—it ran up into thousands of graves on Monkey Hill—and they told me that the persons who were buried there were the workmen that were on the construction of the Panama Railroad, and that a man was buried there for almost every tie that was laid on the road.

The CHAIRMAN. That was the report at Colon?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. Then you went on toward the Culebra cut?

Mr. DOUGHERTY. Yes, went up to the Culebra cut, and there I saw a lot of buildings, built of corrugated iron, buildings that they would not have any use for in a number of years; they went ahead and

scattered them all along the road, hospital buildings and buildings for the workmen, and it was told to me that the people who had the contract to build them built the buildings and finished up the contract and got the money for it, and a number of the buildings would not be used in several years, even though the work had continued.

The CHAIRMAN. And they were left in a state of comparative dilapidation?

Mr. DOUGHERTY. Yes; they were almost useless at that time.

The CHAIRMAN. As you passed up through that Culebra cut did you observe any evidences of landslides?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. Were they serious?

Mr. DOUGHERTY. Well, they were not serious at that time, but without being properly banked with either concrete or rock I thought they would at all times, especially during the heavy rains, wash into the canal; and I was particularly impressed with the condition of the Chagres River, being so close to the canal and being so much higher than the canal.

The CHAIRMAN. Was there any flood in the Chagres River while you were there?

Mr. DOUGHERTY. Not at that time, but I learned there had been floods there, and some of the people there, especially Mr. Peterson, who was my interpreter in Peru, and who was at work on the canal at the start, told me that the Chagres River had broken its banks while they were at work on the canal and had done a great deal of injury and washed a great deal of material into.

The CHAIRMAN. Did you see signs of washes?

Mr. DOUGHERTY. Yes; I saw signs of washes into the canal from the river.

The CHAIRMAN. Did you observe any marks on the trees or anything of that sort to show the extent of the flood?

Mr. DOUGHERTY. No, I can not recall that to mind. You see, I had not anything of this kind in view of coming here.

The CHAIRMAN. Oh, of course not.

Mr. DOUGHERTY. I had read so much about the canal before going to Peru that while I had this time I thought I would make these observations, like every man who is interested in that kind of work.

The CHAIRMAN. You wanted to ascertain what could be done in any country that you happened to be in?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. How did that country compare with Peru in respect to healthfulness?

Mr. DOUGHERTY. Peru is a healthy country with the exception of the district known as Berrugas.

The CHAIRMAN. Is that the country in which you were at work there?

Mr. DOUGHERTY. Yes; I worked right in the sickly part of Peru, which is known as Berrugas. They have a fever called the Berrugas fever. It attacks you like rheumatics, and then you have a heavy fever, and then a breaking out of what is known as a bloody wart. It is claimed by Prescott, in his history of the Incas, that it was the only place in the world where this fever was known; and it takes in a radius of only about twelve miles.

The CHAIRMAN. Was the mortality great there in Peru?

Mr. DOUGHERTY. Yes; I lost 137 men out of 1,300 men at work.

The CHAIRMAN. For how long a time?

Mr. DOUGHERTY. About seven months in that particular work. I lost no men at any other place in Peru.

The CHAIRMAN. You had no yellow fever in Peru?

Mr. DOUGHERTY. No, sir.

The CHAIRMAN. Was this yellow fever that you saw at Panama generally distributed among the population of the city?

Mr. DOUGHERTY. That is what they told me. When we landed I went to the Central Hotel for two days, and the captain of the vessel advised me to get out; he said there was yellow fever all around there, and so I took the train and went to Colon.

The CHAIRMAN. Did you ascertain whether it was prevalent among the inhabitants of the country between Panama and Colon?

Mr. DOUGHERTY. No; I did not.

The CHAIRMAN. Was there any yellow fever at Colon?

Mr. DOUGHERTY. No, sir; not a case.

The CHAIRMAN. Was there any fever of any kind there?

Mr. DOUGHERTY. You could see the natives going round more dead than alive; they had that "breakbone" fever, and what was known as the Chagres fever. They were yellow and bent over and without any vim at all.

The CHAIRMAN. Now, taking the condition of the country that you saw there and of the population that you saw and the health as you observed it, would you consider that any great public work could be conducted there on prices that would compare with prices, for instance, in the United States.

Mr. DOUGHERTY. No; it could not.

The CHAIRMAN. About what would be the percentage of difference?

Mr. DOUGHERTY. I think the percentage of difference in the price of labor between Panama and sections of the United States where I have worked and done work would be at least 100.

The CHAIRMAN. That is, it would cost twice as much for work there as it would here?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. On account of the labor?

Mr. DOUGHERTY. Yes. You can not get engineers for first-class labor, skilled labor, to go to Panama for double the price that you can hire them in this country, and we all know that there is no skilled labor to be gotten at Panama.

The CHAIRMAN. By skilled labor you do not mean professional labor?

Mr. DOUGHERTY. No; I mean skilled labor, not professional; but then, you can not get professional labor except at high prices.

The CHAIRMAN. Is there any other matter that you know of in connection with this subject that would be of usefulness or interest?

Mr. DOUGHERTY. No, sir; I think not; only that I could say this, that the machinery as I saw it—the bridge material and other appliances—was in such condition that I do not believe that they would be worth anything to use for any contractor that went there.

The CHAIRMAN. You mean the machinery and the material that had not been erected?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. And put into the road or the canal?

Mr. DOUGHERTY. Yes.

The CHAIRMAN. You mean that it was rusted?

Mr. DOUGHERTY. It was rusted and deteriorated, and it is obsolete; it would hardly pay to raise the machinery unless it would be for ballast coming back and then sell it as junk.

The CHAIRMAN. Was there any great quantity of it?

Mr. DOUGHERTY. As I say, these locomotives and numbers of cars and tug boats and some dredges and some stoops.

The CHAIRMAN. Up in the Culebra cut, or as you approached the Culebra cut and Imperador, after leaving the Chagres River, did you discover any machinery in there that had been buried by these slides?

Mr. DOUGHERTY. Yes; there were some locomotives in there and some dump cars.

The CHAIRMAN. Buried up?

Mr. DOUGHERTY. Yes, practically buried—yes, sir. They were more than two-thirds covered with dirt—dirt that had slid in from the sides of the cut.

The CHAIRMAN. I do not know of any other question. I suppose you are satisfied with the statement that you have made?

Mr. DOUGHERTY. Yes, sir.

The CHAIRMAN. That is all.

STATEMENT

OF

GENERAL EDWARD PORTER ALEXANDER

BEFORE THE

**SUBCOMMITTEE OF THE COMMITTEE ON INTEROCEANIC
CANALS, UNITED STATES SENATE,**

CONSISTING OF

**SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER, OF LOUISIANA.**

ISTHMIAN CANAL.

WASHINGTON, D. C., *Saturday, March 8, 1902.*

The subcommittee met at 10.30 a. m.

Present: Senators Morgan (chairman), Hanna, and Mitchell. Also Senator Kittredge, a member of the committee.

STATEMENT OF GEN. EDWARD PORTER ALEXANDER.

Gen. EDWARD PORTER ALEXANDER appeared and was duly sworn by the chairman.

The CHAIRMAN. General Alexander, you are a civil engineer?

General ALEXANDER. Yes, sir.

The CHAIRMAN. How long have you been engaged in that pursuit?

General ALEXANDER. I graduated at West Point in the corps of engineers in 1857, and have been more or less at civil or military engineering, railroading, and kindred matters ever since.

The CHAIRMAN. You are not now in the United States Army?

General ALEXANDER. No, sir.

The CHAIRMAN. You resigned from the Army?

General ALEXANDER. I resigned at the breaking out of the war and served in the Confederate army.

The CHAIRMAN. During the time of your service in the United States Army as an engineer, did you have anything to do with public works of importance?

General ALEXANDER. No, sir; all my services was with the engineer troops in the field.

The CHAIRMAN. After the civil war was over, did you have any connection with enterprises of a public character?

General ALEXANDER. After the civil war I was first professor of engineering and mathematics in the University of South Carolina for four years, and then I went to railroading and I was engaged in railroading generally as manager of roads with engineers doing work under me for some twenty years, more or less. Since then I have been on two governmental commissions, one on the improvement of The Dalles of the Columbia River, The Dalles and Salido Falls in Oregon, and one commission on the connection between the Chesapeake Bay and the Delaware Bay. These were joint commissions of civilians and army and navy officers generally. Then for three and a half years I was employed as engineer arbitrator of the boundary survey between Nicaragua and Costa Rica, by those two Governments.

The CHAIRMAN. Where did you reside during the time you were thus employed by Nicaragua and Costa Rica?

General ALEXANDER. My headquarters were generally at Greytown, Nicaragua.

The CHAIRMAN. And how much of your time did you spend there?
General ALEXANDER. I suppose I spent three-fourths of the time there.

The CHAIRMAN. For how many years?

General ALEXANDER. Three and a half years.

The CHAIRMAN. You had your residence there then?

General ALEXANDER. Yes.

The CHAIRMAN. Did you have your family with you?

General ALEXANDER. No, sir.

The CHAIRMAN. How did you find the health conditions of Greytown during your residence there?

General ALEXANDER. I found them very good indeed; never lived in a place that had less malaria.

The CHAIRMAN. Is there much population in Greytown?

General ALEXANDER. No, very small; only about 1,400.

The CHAIRMAN. What years were these?

General ALEXANDER. 1897, 1898, 1899, and part of 1900.

The CHAIRMAN. You had no corps with you under your particular charge?

General ALEXANDER. No, sir; not under my control. The two States, Nicaragua and Costa Rica, had engineering corps in the field—a corps made up of joint employees in the field.

The CHAIRMAN. And your business was to settle difficulties that they might arrive at in making the actual survey and location of the boundary?

General ALEXANDER. Yes. I had nothing to do with the work as long as they agreed upon it. Only when they disagreed I arbitrated the points of disagreement.

The CHAIRMAN. Where did you establish the boundary line between Costa Rica and Nicaragua, beginning at or near Greytown?

General ALEXANDER. It begins on the right bank of the river—the extremity of the right bank of the river—follows the right bank to within 3 miles of Castillo on the river.

The CHAIRMAN. How far is the initial point from Greytown?

General ALEXANDER. About 3 miles.

The CHAIRMAN. Down the coast toward the east?

General ALEXANDER. Yes; northeast from Greytown.

The CHAIRMAN. What is the trend of the coast there by the compass?

General ALEXANDER. I should say that it was northwest and southeast.

The CHAIRMAN. Then you followed up the right bank of the San Juan?

General ALEXANDER. Within 3 miles of Castillo. Then it runs around Castillo on a radius of 3 miles until it comes within 2 miles of the river above Castillo. There it turns and runs parallel to the San Juan River until it comes within 2 miles of the lake. Then it runs around the southeast corner of the lake, keeping again 2 miles from the actual water line until it comes to the river Sapoa. At that point it runs across to the Pacific Ocean, to the center of Salinas Bay.

The CHAIRMAN. Now, in establishing the line as you have described it, what was your guide? Was it high water or low water as your guide for the proper place for the location of the boundary between the two States.

General ALEXANDER. In ascending the river the boundary line was low-water mark at a navigable stage; not the extreme low water, but

ordinary low-water mark at a navigable stage. That was the boundary all along the river. When we came to the lake the boundary of the lake was taken as ordinary high water.

The CHAIRMAN. Before proceeding to inquire about those particulars, I want to ask you as to what this treaty or this award of President Cleveland provided in regard to the control of the river itself as between Nicaragua and Costa Rica.

General ALEXANDER. The control of the river was given entirely to Nicaragua.

The CHAIRMAN. What about the rights of navigation?

General ALEXANDER. Costa Rica has the right to bring vessels of peace on the river, but not vessels of war.

The CHAIRMAN. Did she have the full and free right to navigate the river?

General ALEXANDER. Yes; the full and free right to commercial navigation.

The CHAIRMAN. That was provided in the award of President Cleveland?

General ALEXANDER. That was provided in Mr. Cleveland's award, and the treaty on which it is based.

The CHAIRMAN. Then on the river section of the survey the line was to be located and was located on their low-water mark?

General ALEXANDER. Yes.

The CHAIRMAN. The river being in a navigable stage?

General ALEXANDER. Yes.

The CHAIRMAN. In selecting that as the line, I suppose you had reference to the fact that both countries were interested in the navigation of the river?

General ALEXANDER. Yes.

The CHAIRMAN. Commercially?

General ALEXANDER. Yes.

The CHAIRMAN. How did you ascertain the ordinary low-water mark at a navigable stage of that river?

General ALEXANDER. That was done by these engineers, the four engineers employed by these Governments. They did that without any disagreement; never referred any question to me. They went along from day to day up the bank of the river and they picked out the points that they thought would answer those conditions. I think they were largely governed by the character of the growth. I think they usually took the line of trees as marking the line. Of course it would vary with the physical conditions at many points, but no question was brought to me to arbitrate on that, no question of that sort.

The CHAIRMAN. In ascertaining this line, therefore, they had to understand, of course, what was low-water mark, considered with reference to navigation?

General ALEXANDER. Yes; during the time of their working the water was sometimes high and sometimes low and sometimes it would overflow the mark and sometimes it would be down below it.

The CHAIRMAN. The mark that they set there for the boundaries?

General ALEXANDER. Yes; but they always agreed upon it.

The CHAIRMAN. Did you observe those overflows?

General ALEXANDER. I observed some. I went up and down the river several times and saw some of them.

The CHAIRMAN. Were they excessive in any way?

General ALEXANDER. I was surprised to see in a tropical country so few indications of very high floods, especially in the upper part of the river.

The CHAIRMAN. By the upper part do you mean that portion of the river above the mouth of the San Carlos?

General ALEXANDER. Yes; above that there were no high-water marks that attracted my attention as extreme.

The CHAIRMAN. What would you say would be the usual high-water stage there above the normal in that reach of the river between the lake and the mouth of the San Carlos River?

General ALEXANDER. I could not give any figures at all. I made no notes of my observations, but my general impression was one of surprise to see the country only moderately overflowed in the upper reaches of the river.

The CHAIRMAN. To what do you attribute that?

General ALEXANDER. To the fact that the excessive rains which would elsewhere give the river high stages were here spread out in the lake. The lake oscillates very slowly, and the discharge down the river came from the lake, so, therefore, it was pretty uniform. The rain did not affect it very rapidly, and the only tributaries that the river had above the San Carlos were comparatively small, not enough to overflow the country excessively.

The CHAIRMAN. Do you remember to have seen any place between the mouth of the San Carlos and the lake at which there was an overflow of the banks of the San Juan during your residence there?

General ALEXANDER. I can not say that I recollect anything on that subject specially. That was never called to my attention, and I made no special notes or observations on that.

The CHAIRMAN. You say when you got around to the lake region you changed the basis of the line?

General ALEXANDER. Yes; on the lake we changed the basis of the line.

The CHAIRMAN. To what?

General ALEXANDER. To ordinary high water, the average ordinary high water. In fact, I referred that question to the Canal Commission.

The CHAIRMAN. What Canal Commission?

General ALEXANDER. The Nicaragua Canal Commission, under Admiral Walker. They were considering that question at the time when I made my award, and I wrote the Admiral a letter asking him to cable me what the height of the lake was which they would consider as determining the boundary line for a map, and they fixed it, I think, at 106 feet.

The CHAIRMAN. That would be the normal elevation of the lake?

General ALEXANDER. Yes; that was the ordinary average high water of the lake, 106 feet above the sea level.

The CHAIRMAN. I suppose that in your residence there you were out in the country back of Greytown and between that and Silico Lake, and other places there?

General ALEXANDER. Yes; I used to go hunting and fishing around there occasionally.

The CHAIRMAN. Did you have sufficient acquaintance with that part of the country to make up an opinion as to its availability or practicability for the construction of the canal?

General ALEXANDER. It impressed me very favorably; entirely so.

The CHAIRMAN. Please give a description of the soil as you saw it there.

General ALEXANDER. The basis of it all was volcanic sand overlaid with some few feet, perhaps 4 or 5 feet, of vegetable matter.

The CHAIRMAN. What kind of a foundation does that volcanic sand make for a railroad or for the bottom of a canal?

General ALEXANDER. It struck me as very good, what I saw of it in the piece of canal that was excavated by the old canal company, and the part of a railroad that they built.

The CHAIRMAN. Did all that country through there, say from the old canal that they dredged there to Lake Silico, appear to have the same characteristics?

General ALEXANDER. It seemed to have, yes; all apparently the same I never made any borings, but it all seemed to be the same growth, the same flora.

The CHAIRMAN. Well you knew that they were looking out for a canal, that they were there at work?

General ALEXANDER. Yes.

The CHAIRMAN. Did you find anything that suggested to you any difficulty in passing a canal through that country?

General ALEXANDER. Nothing whatever.

The CHAIRMAN. What is the condition of that point at Greytown and its vicinity as to rainfall?

General ALEXANDER. The rainfall there is very heavy. I should say that it would average about 250 inches a year.

The CHAIRMAN. How far does that heavy rainfall extend back toward the west?

General ALEXANDER. I do not know. I was told that up at the lake at San Carlos the rainfall had diminished about half.

The CHAIRMAN. Now, about the winds at Greytown. Do they blow constantly or not?

General ALEXANDER. It seems to be well within the influence of the northeast trades.

The CHAIRMAN. Was that a wind that blew every day?

General ALEXANDER. Pretty much every day, yes, sir, and up on the lake it was quite marked. I never saw the lake when there was not a good deal of influence of the northeast trades upon it. In fact, navigation on the lakes was quite difficult for small boats.

The CHAIRMAN. Rough?

General ALEXANDER. Yes; it was so rough.

The CHAIRMAN. Was that a characteristic of the navigation there on the lake, that the water was put in motion by the wind?

General ALEXANDER. Yes, the lake is always a rough lake, and very few boats go out on it, except the comparatively large ones. The little canoes of the river are seldom seen on the lake at all.

Senator KITTREDGE. That is Lake Nicaragua of which you are speaking?

General ALEXANDER. Yes.

The CHAIRMAN. From what direction does that wind come that agitates the lake?

General ALEXANDER. Generally from the northeast.

The CHAIRMAN. From the direction of Greytown?

General ALEXANDER. Yes; perhaps a little more north than Greytown.

The CHAIRMAN. It sweeps right across?

General ALEXANDER. Yes; Greytown is pretty nearly east, I think.

The CHAIRMAN. It sweeps right across there?

General ALEXANDER. Yes.

The CHAIRMAN. There is a gap in the cordilleras there, is there not?

General ALEXANDER. It is a low area. You would hardly call it a gap, because the mountains are very irregular, just as they generally are, but there is nothing very high between it and the Atlantic Ocean.

The CHAIRMAN. Well, how is the country out west from the lake?

General ALEXANDER. That is what you would call a low, mountainous or hilly country only.

The CHAIRMAN. Were you ever over on the Pacific coast there?

General ALEXANDER. Yes; I landed once at San Juan del Sur and rode through the country to Rivas.

The CHAIRMAN. San Juan del Sur is about 4 miles from Brito, is it not?

General ALEXANDER. Yes; a little south of it.

The CHAIRMAN. Did you find the same conditions as to the wind there?

General ALEXANDER. Yes.

The CHAIRMAN. What year was that?

General ALEXANDER. That was in July, 1900.

The CHAIRMAN. I wish you would describe that country as to its eligibility for civilized people—for white people—its productions, and other matters connected with agriculture. Just give a description of it as you saw it.

General ALEXANDER. It impressed me as one of the most attractive countries that I ever saw for a poor man to make a living in. As I laughingly told the gentleman who was escorting me around, if I had to be born again I would ask the angel that was bringing me down to take me to Nicaragua, if I was to be landed without any money; that I would rather light in Nicaragua than in any other place I knew.

The climate is very pleasant. The agricultural opportunities are limitless. The soil is good, and I do not know a more attractive country than that.

The CHAIRMAN. Do they raise a variety of crops there?

General ALEXANDER. Everything in the world.

The CHAIRMAN. What are the characteristics of the population?

General ALEXANDER. Its population are a good, plain, country people. They seem to be amiable, courteous, and polite, and I do not think they were specially disposed to go into insurrections or rebellions. They are industrious enough at anything—in fact, they are very industrious at anything that they are used to. They would not do much if you put them at a wheelbarrow and a ditch, perhaps, but put them in the woods with a machete or on the river with a paddle and they will do as good a day's work as any man that I ever saw. There are plenty of instances there of men whom I saw who are in very comfortable circumstances, who started out in life with nothing but a machete, who have got little coffee plantations, fruit plantations, etc.

The CHAIRMAN. Does coffee grow abundantly in that country?

General ALEXANDER. Yes.

The CHAIRMAN. Of good quality?

General ALEXANDER. While I was there, in 1889, it was Nicaraguan coffee, raised in the vicinity of Matagalpa, that brought the highest price in London of any coffee sold that year from any part of the world.

The CHAIRMAN. That Matagalpa country is a white settlement, is it not?

General ALEXANDER. Yes.

The CHAIRMAN. Americans or English?

General ALEXANDER. Americans and English, quite a lot of them; several from Georgia; some that I knew who went up there, and they

have taken up all of the available lands in that section, I heard, and they are establishing coffee plantations and other things of that kind.

The CHAIRMAN. A prosperous people?

General ALEXANDER. Yes.

The CHAIRMAN. Are they peaceable and obedient to the laws?

General ALEXANDER. They seem to be so, entirely.

The CHAIRMAN. What do you think of that region of country, including Costa Rica and other parts of Central America that would be accessible commercially to the canal, as a feeder to the canal, the income of it?

General ALEXANDER. I think it ought to be one of the richest tropical countries in the world.

The CHAIRMAN. Capable of sustaining large population?

General ALEXANDER. Yes.

The CHAIRMAN. What would you expect from the health of the people?

General ALEXANDER. There is no trouble about the health anywhere in that country, I think.

The CHAIRMAN. You found it healthy?

General ALEXANDER. I found it so, entirely.

The CHAIRMAN. Did you have as good health there as you had at home in South Carolina?

General ALEXANDER. Entirely so; yes, sir.

Senator MITCHELL. That condition as to health applies to both sides of the divide, does it?

General ALEXANDER. Yes, sir.

The CHAIRMAN. Are there extensive or valuable mineral resources in that region of country?

General ALEXANDER. I do not think anything to amount to a great deal. Gold is worked in several places. That is the only thing that I heard of, and nothing very extraordinary in that, but there are a number of small but profitable gold mines.

The CHAIRMAN. How much timber in the country?

General ALEXANDER. Unlimited timber.

The CHAIRMAN. Is it good timber?

General ALEXANDER. Yes; there is mahogany and cedar, and I forget the names of all the different kinds, but there is unlimited timber.

The CHAIRMAN. Is it in heavy, thick forests or is the timber scattered?

General ALEXANDER. Very thick indeed; one mass of forest over everything.

The CHAIRMAN. Large, tall trees?

General ALEXANDER. Enormous trees.

The CHAIRMAN. How about india rubber?

General ALEXANDER. There was quite a good quantity of india rubber constantly being gathered all the while I was there. Every merchant nearly in town had a few rubber getters who were paid to go into the woods. These rubber getters would go into the woods and be gone a month or two and come back with rubber which they would sell and then go out again. That was going on all the while.

The CHAIRMAN. Would you say it is a country that is likely to be very productive in rubber?

General ALEXANDER. I see no reason why rubber plantations should not be very profitable there. There was some work done while I was there in one or two places on the river above Greytown that were being planted in rubber trees, and I have heard of rubber plantations started

near Bluefields. I saw one small rubber plantation over at Jenotepe on the Pacific side.

The CHAIRMAN. Is there a region of country in Nicaragua between Bluefields or the northwestern border of Nicaragua and the line of the San Juan River that is as yet a wilderness?

General ALEXANDER. Pretty much the whole of the Atlantic slope is a wilderness, except along the water courses. There are no roads anywhere. I do not know of a single road in that country on the Atlantic slope except the water courses, where you go with a canoe, and some little short portages connecting the streams.

The CHAIRMAN. Bluefields is the chief mart for that wilderness country, is it not?

General ALEXANDER. Yes.

The CHAIRMAN. Is there a very considerable trade carried on at Bluefields?

General ALEXANDER. Yes.

The CHAIRMAN. In what?

General ALEXANDER. Mostly bananas.

The CHAIRMAN. Is that up and down the water courses?

General ALEXANDER. Yes; they plant banana plantations all along the water courses and then bring the fruit to Bluefields, where the steamer takes it.

The CHAIRMAN. The wilderness part of that country, if it is populated at all, is populated by Indian tribes, I suppose?

General ALEXANDER. Yes.

The CHAIRMAN. The Mosquito Indians?

General ALEXANDER. Most of them are along the water courses. I doubt whether there is any population at all through the forests. Everything comes to the water, because only there can people travel.

The CHAIRMAN. It is an unexplored country so far as white men are concerned?

General ALEXANDER. Very largely unexplored; yes, sir.

The CHAIRMAN. Is it a large country?

General ALEXANDER. Yes.

The CHAIRMAN. What State in the Union would correspond in area with Nicaragua?

General ALEXANDER. I really could not tell what the square mileage is. Their maps and ours are not usually published together and on the same scale. I should say, roughly, that its area is about 400 miles square.

The CHAIRMAN. How about Costa Rica; what are the characteristics of that country, that you saw?

General ALEXANDER. Costa Rica is much more mountainous than Nicaragua. The mountains are very much higher. The Atlantic coast of that, too, is but little cultivated, only along the line of railroad and the lines of the rivers, with an occasional portage from one to the other. The Pacific part of Costa Rica is quite densely populated and highly cultivated, over on the Pacific slope.

The CHAIRMAN. Are the characteristics of the people higher or better or lower than those of Nicaragua?

General ALEXANDER. I should say that they are all practically the same people.

The CHAIRMAN. A frugal, thrifty, industrious population?

General ALEXANDER. Very, indeed.

The CHAIRMAN. Farmers?

General ALEXANDER. Yes. A great many men in both States are educated in the United States or abroad, and I think both of the States have very promising futures before them.

The CHAIRMAN. Take just those two States together, without reference to Salvador or Guatemala would you say that they would make a valuable contribution to the commerce of this canal, if dug at Nicaragua?

General ALEXANDER. I think they would, sir.

The CHAIRMAN. Suppose a canal was dug at Panama, would that canal command any of this trade?

General ALEXANDER. No, sir; it could not.

The CHAIRMAN. Could not do it?

General ALEXANDER. No, sir; there is no transportation along the land. Anything up there that wanted to get to Panama would have to go by water, either on the Caribbean or the Pacific side.

The CHAIRMAN. Have you ever visited Panama?

General ALEXANDER. Yes.

The CHAIRMAN. How often and when?

General ALEXANDER. I crossed the Isthmus in 1860, going west, and came back in 1861, and then in 1900, I spent a week at Panama, crossed the Isthmus. I went up to San Juan del Sur after spending a week at Panama.

The CHAIRMAN. You mean the city of Panama?

General ALEXANDER. Yes.

Senator MITCHELL. What time in 1860 did you cross?

General ALEXANDER. I went out in August, 1860, and came back in May, 1861.

Senator MITCHELL. The reason I asked you is because I crossed in May, 1860.

The CHAIRMAN. In going out you landed at Colon?

General ALEXANDER. Yes.

The CHAIRMAN. And took the railroad?

General ALEXANDER. Yes.

The CHAIRMAN. The railroad was completed through, was it?

General ALEXANDER. Yes.

The CHAIRMAN. And in coming back you landed at Panama and took the railroad across to Colon?

General ALEXANDER. Yes.

The CHAIRMAN. Now, during the time you stayed at Panama what was the condition of the health of that town?

General ALEXANDER. It was very bad indeed. There was yellow fever in the town and also what they call Chagres fever.

The CHAIRMAN. What year was that?

General ALEXANDER. 1900; and there was said to be a great deal of sickness among the troops that they had there. I knew nothing about that except what was told me.

The CHAIRMAN. You did not actually witness it?

General ALEXANDER. No, sir.

The CHAIRMAN. You have seen the tides come in and go out at Panama?

General ALEXANDER. Yes.

The CHAIRMAN. When they go out, what area of land is left exposed to the sun—what proportion?

General ALEXANDER. Well, it is very large. The fall of the tide is some 20 or 21 feet. The flats that are exposed are very extensive. I think it would be a very easy thing to determine that from the maps

I never thought to make an accurate estimate. The maps must show it far better than anything that I can state. The bay is shallow. You know that the vessels have to lie off some miles from the shore.

The CHAIRMAN. How many miles?

General ALEXANDER. It is my impression that they have to lie off 5 or 6 miles. A great part of that flat is bare when the tide goes out.

The CHAIRMAN. What sort of a bottom does it leave exposed to the sun?

General ALEXANDER. It is mud and coral rock.

The CHAIRMAN. Is there much mud?

General ALEXANDER. Well, I could not say. I could hardly divide it. I only noticed the thing casually when I was walking around the battlement and places in the city. I also went to the pier where they were fixing to have vessels unload.

The CHAIRMAN. On the canal?

General ALEXANDER. On the canal; yes. The railroad's pier.

The CHAIRMAN. That is some 3 miles away from Panama?

General ALEXANDER. Yes; about 3 miles from Panama. I had no business which caused me to take any special interest in it, and I could not give any details beyond the general fact that I saw those enormous flats exposed all around there whenever the tide went out. They are apparently mud and coral, but I never noticed specially to see how much was mud and how much was coral.

The CHAIRMAN. If that is the cause of the sickness there, yellow fever and Chagres fever, would there be any possible chance ever to institute measures of effectual sanitation there with that great sweep of mud?

General ALEXANDER. I do not think it would be easy to cure that—to improve the sanitation of that country—because one thing that affects it a great deal is the dead calm that prevails there most of the time. There is very little wind, and with the little wind and this great expanse of mud it makes the whole region unhealthy—not only the city of Panama itself, but all the neighborhood. So I understood from the people with whom I talked. I saw the houses built for the French engineers and different people that they employed, not in the city, but off on the headlands and everywhere around. The unsanitary influences seemed not to be confined to the city, but to pervade all that part of the country.

The CHAIRMAN. So that you think it would be beyond the art of man within a reasonable cost to create sanitary appliances and regulations in the Bay of Panama that would save it against this exhalation from the mud flats there?

General ALEXANDER. That was the impression formed on my mind very decidedly.

The CHAIRMAN. There being no wind to bear it off?

General ALEXANDER. Yes; that the place will always be a fever hole.

The CHAIRMAN. How did the country impress you or what did you learn between Panama and Colon in the same connection?

General ALEXANDER. All that I learned of it led me to think that there was no difference, that the same conditions existed; that Panama was perhaps a little the worst, but that conditions nearly as unhealthy prevailed also at Colon.

The CHAIRMAN. What detained you a week at Panama in the midst of that sickness?

General ALEXANDER. I was going north and I could not get a steamer. All the steamers made connections in such a way as to make you lie over in Panama. Everybody that arrived in Panama or in Colon at that time, bound either north or south, had to stay a week at one place or the other, either at Colon or Panama.

The CHAIRMAN. What line did you go up the coast on?

General ALEXANDER. There are three lines; I think I went on the regular Pacific mail boat.

The CHAIRMAN. That ran in connection with the railroad?

General ALEXANDER. Yes.

The CHAIRMAN. Did you make any observations in respect to the canal work that was being done the last time you visited there?

General ALEXANDER. No, sir.

The CHAIRMAN. You did not observe about it?

General ALEXANDER. No, sir; of course I looked out of the car windows as I went along, but only got a very general view.

The CHAIRMAN. Have you ever studied the question of commercial advantages with respect to these two canals?

General ALEXANDER. Yes, to some extent. Having been a railroad man for about twenty years in the South, I have taken a very decided interest and have had very decided views as to which of the routes the country should adopt. It seems to me that it is a question of dollars in the transportation of freight, and the cheapest freight that this world knows is a sailing vessel. It seems to me that to rule out the sailing vessel forever from this country in building this canal is monstrous. The sailing vessel is not only very important in itself, but it is the basis of the rates made by the steamships, and the rates made by the steamships are the basis of the railroad rates in the country, so that practically all the rates in the United States are finally based at the bottom on the sailing vessels.

Senator MITCHELL. Just in that connection, will you explain how the sailing vessel would be ruled out by the action of the Government in the construction of either canal?

General ALEXANDER. The route by way of Panama is impossible to a sailing vessel—practically impossible.

The CHAIRMAN. By reason of the calms?

General ALEXANDER. By reason of the calms; yes, sir. It is usually said that the route by Panama is 400 or 500 miles longer than the route by Nicaragua. If you look at the place where a sailing vessel would have to go, the route over which it would have to sail, it is 1,000 to 1,500 miles longer. When the vessel crosses the Isthmus at Panama she has got to go on and cross the equator and go down some 7° or 8° south of the equator, perhaps, before she starts to go to San Francisco.

Senator KITTREDGE. Does not competition influence to any extent the rates charged by steamships?

General ALEXANDER. Oh yes, greatly; but the sailing vessel is under both of the competitors. They are competing with the additional stimulus of the sailing vessel under them ready to cut their lowest rates, if either of them allows a margin. If you want to transport anything from one port of this world to another at the *lowest possible cost*, regardless of time, the sailing vessel alone can do it for you. If you will let me state in my own way—

The CHAIRMAN. That is just what I want you to do. I do not care to ask you any questions. In fact I did not know that you had ever studied the question. Go on and make your statement.

General ALEXANDER. I notice in Professor Ernst's testimony a little paragraph stating in a few words what the Commission found the advantages of Panama to be. The advantages of Panama, according to that statement, are a shorter canal, a better knowledge of the country, a lower cost of operation——

Senator KITTREDGE. Operation and maintenance.

General ALEXANDER. Operation and maintenance I considered together as one, and the other advantage was fewer curves.

Senator MITCHELL. You are stating now what Mr. Ernst said.

General ALEXANDER. I am giving a synopsis of that statement. I have not read it exactly, I have just culled out the points. The special advantages that the Commission give, which are referred to in the testimony of Colonel Ernst, are fewer curves, a shorter line, lower cost, and a more complete knowledge of the country.

Well, as we have not got absolute knowledge of everything on either route, I do not think the more complete knowledge of the more difficult route can cut very much figure.

The curves are all compensated for. The most abrupt curve of all on the Panama route is the one that is gratuitously adopted to get into the canal itself, showing that the most abrupt curve in the whole business is not too abrupt for vessels to use freely. Moreover, after curves are compensated for to parade them in a comparison is like counting them twice—like giving a percentage for contingencies and then giving another percentage for contingencies on top of that.

Really, the entire difference between the two schemes, as the Commission estimates them, is \$5,000,000 in original cost and \$1,350,000 a year in cost of operation in favor of Panama. Now, for that little sum of \$5,000,000 and \$1,350,000 a year, should this country rule itself out forever from the use of sailing vessels through the Isthmus, and, besides that, accept one and two days' loss of time on 90 per cent of its steam commerce, and still, beside that, take all the risks and expense connected with the exposure of all our commerce to fever and to quarantine on the Panama route? That is the question in a nutshell. Surely the United States, for such a small economy, in such a large undertaking, would never be satisfied with such a one-horse solution. It would not pay for the risk of yellow fever alone. And it would involve, besides, another risk.

In another generation the demand for a sailing route might easily result in building a canal for moderate-sized vessels through Nicaragua by some commercial syndicate who, with the advantages of its geographical position and the threatening opportunities of its strategic position, could force the United States to buy it out. But if the United States occupies the Nicaragua position first the Panama route could never rival it, either for military or commercial purposes, because it will always have the short line and interior position.

Senator MITCHELL. How about earthquakes on the two routes?

General ALEXANDER. I just take the report of the canal Commission on that, accepting every fact that they state. I believe they say that there is about equal chance of earthquakes on either route.

The subcommittee, at 1.30 p. m., took a recess until Monday, March 10, 1902, at 10.30 a. m.

STATEMENTS

OF

CHESTER DONALDSON AND WILLIAM B. SORSBY

BEFORE

THE SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

WASHINGTON, D. C., *June 7, 1900.*

TESTIMONY OF CHESTER DONALDSON.

CHESTER DONALDSON, sworn and examined:

By the CHAIRMAN:

Q. What office are you at present holding?—A. I am United States consul at Managua, Nicaragua.

Q. How long have you been in that office?—A. Since January 12, 1898.

Q. During that period of time have you resided in Managua?—A. Yes.

Q. Had you resided there before that?—A. Yes.

Q. How long?—A. I had resided there about two years before.

Q. In what capacity did you first visit Nicaragua?—A. In connection with the commission of 1895—General Ludlow's commission.

Q. Were you a member of that commission?—A. No; but I was employed by the commission.

Q. In what character?—A. As an engineer.

Q. Are you a civil engineer?—A. Yes.

Q. In what schools have you been educated?—A. Hamilton College is where I got my education—Clinton, N. Y., near Utica.

Q. Did you attend any other engineering schools?—A. I took a short course in Columbia School of Mines. I did not take any degree

there because I had no need to do so. I have two degrees from Hamilton, and I simply took a short course at the Columbia School of Mines in order to perfect myself in certain things.

Q. By whom were you employed?—A. By General Ludlow and the commission.

Q. What did you particularly do on that commission?—A. My particular duties were gauging streams, sounding rivers, and hydrographic work generally.

Q. Did you do any line work on the land?—A. No.

Q. Was any line work done by the Ludlow commission?—A. I can not say positively, because I was sent off one way and do not know what other engineers may have been doing. So that I would rather not say yes or no, because I am not quite positive.

Q. Was any effort made there to make a line survey?—A. Very little, I should say. I think they did a little, but very little.

Q. Did you make any soundings at the harbor of Greytown?—A. No; I made no soundings there. While we were working in the woods several of our men were sent down to Greytown, and I believe they made some soundings. An engineer connected with the party whose name was Wood was one that was sent down. He and several other men were sent to Greytown. I am not aware of what they did there.

Q. Did you pass over any of the line called the Lull survey?—A. No; the Menocal survey was the one we studied. It crosses over the divide from Ochoa to Greytown.

Q. Have you ever been on the Lull survey?—A. No, I have never been across on that line. I have been up and down the river many times, but I never left the river at the point where the Lull survey does, and never followed that.

Q. Do you know the character of the country between the river and the Lull survey?—A. Yes, I know more or less of it. The Lull survey is less hilly and there are not so many cuts to be made. The Menocal survey crosses nearly a hundred ridges and streams.

Q. By that you mean perpendicular to the San Juan River?—A. Yes; the canal leaves the river, making it necessary to have many cuts and fills. The other, I always had an idea, was the better route, because there is less cutting to be done.

Q. There is some cutting to be done on the Lull route?—A. Undoubtedly they have to do some cutting.

Q. From the fact that the points of the ridges jet into the San Juan River?—A. Yes.

Q. Are there considerable elevations?—A. From 50 to 200 feet, and they are continuous, with streams in between. There are narrow little ridges and streams with very swampy lands, and these little steep hills, from 50 to 200 feet high.

Q. What is about the elevation of the general level in the flat lands above the ordinary stage of water of the San Juan River, between the San Juan River and the ridges?—A. The flat lands are very low and swampy.

Q. About what is the elevation of the flat land above the ordinary bed of water in the San Juan River?—A. At the river bank it is 10, 12, or 15 feet high, and as you go back it gradually rises.

Q. But there is a general elevation of that flat country?—A. Yes; I should say from 10 to 15 feet, more or less.

Q. A portion of that flat country, I suppose, is marshy?—A. Yes; very marshy. That flat land between the ridges of hills is almost all

marshy and overgrown with moss, so that it is very difficult to work through.

Q. Is that flat land covered with trees?—A. No; in many of the swamps there are no trees at all.

Q. What you call savannas?—A. Yes; savannas. You may run a pole down through the soft mud, and, I suppose, through old leaves and rotten timber of all kinds. The soil is very black and very mucky.

Q. That is in the interval between the ridges?—A. Yes. These ridges are made up of reddish dirt, with sandstone rock.

Q. This mucky area you speak of lies between the ridges?—A. Yes; there are little streams in the center, and some of them spread out very wide. There is a plain only 50 or 100 yards wide, and then you come to another ridge.

Q. The country you are now describing is the region through which the Lull survey was projected?—A. The one I am describing is the one that the Menocal route goes through. The Lull route goes through a number of miles below, avoiding many of the ridges I have spoken of. The Lull route does not leave the San Juan River until 12 or 15 miles below, so that, even though it should run back a good way from the river, it would not have many of these ridges to meet.

Q. I want the general elevation of the country on which the Lull route was projected.—A. I ought not to say much of that, because I have not been over that route. My ideas are simply the general views that I got when going up and down the river.

Q. Well, from that view?—A. It looked as if it were almost all low land.

Q. Is that the country of which you speak when you say that the elevation is from 15 feet up?—A. Yes; even in the lowest swamps you will always see these elevations, most generally 10, 12, or 15 feet high.

Q. So that it is a well-defined border of the river?—A. Yes; perfectly defined.

Q. You say that your business there was the measurement of the waters, their flow and their height?—A. Yes; gauging streams and estimating the quantity of water which flows through them.

Q. In flood times and also in the dry season?—A. Yes; but we were there in the dry season and could not make much of an estimate of flood times. At flood times, of course, the water would flow more rapidly, so that there would be not only a greater depth of water, but a more rapid rate, and not knowing that rate, I could not well make an estimate. Our commission had to take the figures of others, because we were not there long enough to take figures of the different seasons. Admiral Walker's commission was there a long time, and will be able to answer these questions.

Q. You ascertained as well as you could what the elevations were and what they would be in flood seasons?—A. Yes.

Q. Did you find any marks upon the trees or at other places which indicated the highest stage of water in that country so as to form an estimate at all reliable?—A. Yes; we could tell almost to a point how high the water rose at its highest elevation.

Q. Did you discover on the Lower San Juan, below Ochoa, any evidence that that stream had ever been out of its banks so as to overflow the country around?—A. No; I do not think it had ever been out of its banks.

Q. So that this flat country which lies along the left bank of the San Juan River is a country that is practically elevated above the high water of the San Juan River?—A. Yes. Yes; the river never runs over its banks so far as I have been told. I have been up and down the river, not as an engineer, when the water was about as high as it ever gets. I have been up and down the river at nearly all times of the year, traveling back and forth. I was working as an engineer in that country after the commission had finished.

Q. Were you working for private parties or for the Government of Nicaragua?—A. For the Government of Nicaragua. I was simply traveling from one point to another, and I had occasion to go up and down the river frequently.

Q. So that you have been there in what you believe to be the highest flood times?—A. Yes; I have been there when the water was so high that they could go up and down the Toro and Machuca rapids, and I understand that that is as high as the water ever gets.

Q. During all that time did you ever see the San Juan River out of its banks?—A. No; not until it gets near the ocean, in what we call the delta. The land there for miles is covered with a tall grass growing out of the water, but I imagine you would find the ground several feet below, although the grass grows 6 feet above the water.

Q. If I understand you correctly, this space at the delta of the San Juan River where the water of the river is highest is not the space through which the canal would be cut?—A. No; the canal turns off to the left as you go down the river, I do not know about the Lull route, but I have seen maps and pictures of Admiral Walker's work, and I should imagine that this route leaves the river and keeps back on these slightly elevated plains.

Q. As a matter of fact, the survey which Admiral Walker made under his first commission cuts through several of these hills so that it is thrown miles back toward the highland. Do you believe, as an engineer, from what you have seen of that country, that a canal cut through there, so as to include some of those ridges, would be liable to inundation or to any overflow of the San Juan River?—A. No; I do not think it possible. That river never rises like the Ohio, the Mississippi, or the Chagres rivers. Of course when the lake rises, the river rises. When the lake rises 8 feet, the river rises 8 feet; when the lake rises 5 feet, the river rises 5 feet. There are other streams running into the San Juan River, but until you come to the San Carlos there are no streams that would raise the water much in the San Juan River.

Q. Can you give the names of those streams that come into the San Juan River between the mouth of the San Carlos and the lake?—A. There are no really large streams.

Q. Begin at the mouth of the San Carlos and go up.—A. There are probably a dozen little streams coming in there, but they are very small. The San Carlos is really the only river of any size. I would know the names of the others if I saw them printed.

Q. The point I want to make is this: Whether or not the San Juan River, between the San Carlos and the lake, is liable to any sudden or great inundation from the little streams that come in from the hills?—A. No; there are no rivers there. When you pass them on a steamer they are so small that you do not imagine they are rivers at all. I remember one, 2 or 3 miles below the town of San Carlos, which is

the only stream that you could call a river. That is just above Toro Rapids. I do not recollect its name.

Q. In your capacity as hydrographer to the Ludlow Commission did you take measurements of the depths and currents and of the volume of water at various places between the mouth of the San Carlos River and the lake?—A. We gauged the San Juan River at San Carlos, and again just above Ochoa.

Q. Is the city of San Carlos above the San Carlos River or below it?—A. The town is right on Lake Nicaragua, at the outlet of the lake.

Q. Did you take the flow of water at the rapids of Toro and the other rapids on that river?—A. No. We took the flow of water at two places—one where the lake enters into the river and the other at the dam just above Ochoa.

Q. That is below the mouth of the San Carlos River?—A. Yes.

Q. Then you made observations more or less critically from the San Carlos River to the lake?—A. Yes.

Q. Have you been over that country frequently?—A. Yes.

Q. Both as an engineer and as a traveler?—A. Yes; I have been back and forth, and I went to Bluefields several times. I had to go up and down the river nearly every month of the year, I think. On one of these trips I visited Corn Island.

Q. How far from Corn Island is Bluefields?—A. The distance is called 40 miles.

Q. How far would that be from Greytown?—A. That would be the hypotenuse of the triangle. I should say it is 60 miles from Bluefields to Greytown, which would make Corn Island about 72 miles from Greytown.

Q. What is about the area of Corn Island?—A. It is about 4 miles long, averaging about 2 miles wide—a kind of oval shape, making about 6 square miles.

Q. Has it any harbor?—A. It has no harbor. The only way to land there is to go on the side away from the wind behind the island. There is no difficulty at all in landing, because the water is quiet and deep.

Q. On what side?—A. On the side toward the coast. They go around the southwestern side.

Q. On the lee side?—A. Yes; and the landing there is very easy. With a small iron dock built there boats could safely moor alongside.

Q. There is no harbor of protection for ships there, is there?—A. No; the only protection is the protection of the island.

Q. Is that island entirely mountainous?—A. The island rises gradually from the coast, and near the center is a hill about 400 feet high.

Q. Volcanic?—A. No; not apparently.

Q. Who claims the ownership of that island?—A. Nicaragua owns it and controls it.

Q. Is the island inhabited?—A. Yes; it has about six hundred inhabitants. They talk English.

Q. What are they?—A. The larger part of the inhabitants of that island are the descendants of an English sailor of the name of Downs. There are at least 300 persons of that name on the island, and they all talk English.

Q. Is the island fertile?—A. Yes. The main product is the coconut, but they can raise sugar cane, bananas, plantains, and all sorts of tropical fruits.

Q. Has Nicaragua a governor on the island?—A. A military governor—a colonel or captain, with one company of soldiers.

Q. So that Nicaragua is in undisputed possession of Corn Island?—A. Yes. The only country that ever disputed it was Colombia, and that is the reason why I was sent there. I was sent to make surveys and to report what was necessary to defend it against anything Colombia might send. I made a report of what was necessary to defend the island, because, of course, Colombia has no war ships of any account. I also made measurements and gave directions for constructing a small fort on the top of the hill which commands the whole island.

Q. Returning to Lake Nicaragua. Since your residence in Nicaragua, have you been living right on the border of that lake?—A. I have been living on the border of Lake Managua most of the time; also at Rivas I lived some time before I was appointed consul. That is right near Lake Nicaragua.

Q. What is the distance overland between Lake Managua and Lake Nicaragua?—A. From the city of Managua to Granada is 30 miles. I can not tell you the distance from the nearest point of Lake Managua to the nearest point of Lake Nicaragua, but the two points are considerably nearer than that. The two lakes are connected by the Tipitapa River.

Q. That river is simply an outlet from Lake Managua to Lake Nicaragua?—A. That is all.

Q. It has no affluents?—A. Nothing at all; no rivers run into it.

Q. What is about the length and width of Lake Managua?—A. Lake Managua is about 40 miles long and 20 miles wide.

Q. Is the water deep at ordinary stages?—A. The lake is about 160 feet deep in the deepest place, between the mountains of Momotombo and Momotombito. These two mountains are about 2 miles apart, from the water edge of the one to the water edge of the other, and they descend at the same angle. That point is the deepest place in the lake.

Q. Is the average of the lake deep or shallow?—A. It is not deep, but it is deep enough for navigation. It is from 30 to 40 feet deep, but not so deep as Lake Nicaragua.

Q. Have you noticed the rise in the level of Lake Managua in the rainy season?—A. Yes. I saw Lake Managua in the lowest stage of water it has ever been, and I have also seen it so high that the water rose over the dock built at Momotombo. I should say that Lake Managua rises 10 feet, more or less. I lived for two years right on the border of the lake, my house being right on the beach. That beach was 50 yards wider during the dry time than it was in the year after I returned as consul, which was the rainy season. Then there was a tremendous difference.

Q. Have you observed a rise in Lake Nicaragua equal to that observed in Lake Managua?—No; I do not think that Lake Nicaragua ever rises quite as much as that, though it does rise very perceptibly during the rainy season. It has a rise of from 5 to 8 feet, but I have never seen the water rise in Lake Nicaragua high enough to submerge the docks.

Q. This Tipitapa River, does it flow through a mountainous region?—A. No; it flows through a plain.

Q. How wide is the plain?—A. From 30 to 40 miles wide, I should say.

Q. This river running through about the center of it?—A. Yes; the plain gradually rises, but you do not see any hills. It looks level.

Q. When these greatest floods have come in Lake Managua, have you observed whether the River Tipitapa overflows gradually or whether the water runs out quickly?—A. It runs out pretty quickly, but entirely within the banks of the river. That is a very strange formation of lava. You would think, going by land, that the dock there had been built by man of a dark, burned-looking cement. The river seems to have broken right through there in a perpendicular cut, and the rock is nothing more than a great bed of lava, which has flowed there and may some time have dammed that river.

Q. What towns or villages are there at the head or entrance of the San Juan River?—A. The town of San Carlos.

Q. That is at the exit of the San Juan River to Lake Nicaragua?—A. Yes; it is right at the mouth of the lake. It is situated on a little projecting cape.

Q. At the place where the San Juan River leaves the lake, are there hills on both sides of it?—A. No; hills are on one side. There is a little knoll half mile away on the other side, but the bank close to the river is very low and swampy.

Q. You made your soundings and measurements of the current and volume of water at the village of San Carlos?—A. Yes; that was the first place.

Q. And right across what you call the mouth of the lake?—A. Yes; so that we could get the exact amount of water leaving the lake. Then we measured below to see whether there was any perceptible difference caused by the stream coming in, but we did not find that there was any great difference—not enough to mention. That was in the dry season. In the rainy season I suppose there would be a great deal more, but in the dry season it is almost nothing.

Q. What was the greatest depth of water you found between the village of San Carlos and the opposing bank of the lake across the San Juan River?—A. As I remember that, I think it was a little over 20 feet, perhaps 26 feet.

Q. What width would that 20 feet of depth represent?—A. A good width. It was a gradual descent from the edge to the center and then a gradual rise at the other side.

Q. Is the deepest water near to the village of San Carlos?—A. Yes.

Q. About how deep is the water at the shore of the village?—A. It starts in of course like any other shore, but it goes out rather abruptly. It starts from nothing and goes right on until, say, 1 rod from the shore, there is water enough for a steamer. I should say there is 8 feet of water.

Q. Your report to the Ludlow Commission will show all the measurements you made there?—A. All these measurements were reported to the Ludlow Commission. As soon as we made our figures they were handed over to Mr. Noble, and I take it that they are now in the hands of the commission.

Q. Did Mr. Noble have special supervision of the matter of hydrography?—A. Yes; I think he had special supervision of all the engineering parties that were sent out. I noticed that the other parties gave him their figures the same as we did. I know they must have done a little line work, and I know they always handed their figures to Mr. Noble.

Q. Did you make any borings on that line?—A. No; we had no boring apparatus with us.

Q. Did you undertake to ascertain the depth of the mud deposit?—A. The commission asked Mr. Menocal about that and he showed where borings had been made, but we took no borings, because we had no apparatus.

Q. So that you relied on Mr. Menocal's report for the borings?—A. Yes. I do not know how much General Ludlow relied upon that when he made his report. He did not wish to make any report upon the Ochoa business, because he had not been able to make any borings. With the shortness of our time, with the little amount of money, and with the small apparatus we had he was not willing to risk his reputation as an engineer about that as he had to take Mr. Menocal's word for it.

Q. On the line which you have established there, across the San Juan River at San Carlos village, did you make any examination out to the lake?—A. Yes.

Q. About what distance?—A. Nine or ten miles.

Q. About what was the character of the bottom you found there for that distance?—A. Mud.

Q. What kind of mud?—A. Soft black mud mixed with sand. We had a pole fixed with iron on the end of it, so that we could bring up pieces from the bottom.

Q. Did you make a pretty close examination of that line to the lake?—A. We spent two days at it. We worked hard those two days, taking soundings and bringing up material from the bottom.

Q. Did you encounter any rock?—A. Yes; we struck solid bottom, and in some places we struck rock. In other places we struck what might be called hardpan—hard earth. We could not drive a pole into the hard material at all.

Q. What was about the average depth of the water from San Carlos village out to the lake?—A. The average depth of water there is about 10 feet.

Q. In some places deeper?—A. In some places deeper. But it was very even. For miles there it was not over 10 feet, and I know from experience since that it goes down to about 6 feet. The lake steamer drew from about $5\frac{1}{2}$ to 6 feet, depending upon how heavily it was loaded, and I have been on that steamer when she ran for a half mile with that soft mud at her bottom.

Q. There is a stream coming up from Costa Rica which enters into the lake not far above the village of San Carlos. About what is the distance?—A. About 500 yards from the mouth of the lake. That is the Rio Frio.

Q. Is that a considerable stream of water?—A. Yes; it is not so large as the San Juan River, but it can be navigated with a steamer for 4 or 5 miles.

Q. That stream comes down from the mountains of Costa Rica?—A. Yes.

Q. Have you ever seen that stream in flood?—A. No; I have never seen it in flood, but they say it brings down a good deal of water sometimes.

Q. Is it your opinion that this mud in the lake above the San Juan River has come principally from that stream?—A. I think it has come entirely from it, because there is no other river within several miles

of that point. That is the only river of any consequence that comes in there.

Q. Is there any river of any kind going in there except this Rio Frio?—A. No; they call everything rivers there. A stream that you can jump a cross is called a rio.

Q. Rio does not mean river, but a flowing stream.—A. Yes; they have a Rio Grande there which you can walk across on stones, and yet it is called Rio Grande—great river.

Q. Did you cross the lake, in your examination, in the direction of Brito?—A. Yes; we went to Brito and spent two weeks on that little division between the lakes.

Q. About what distance is it from the mouth of the San Juan River to the point where the canal would leave the lake on the Menocal survey?—A. As I recollect, I think it is between 60 and 70 miles.

Q. After leaving this village of San Carlos and going in the direction of Brito what is the depth of the water?—A. After leaving San Carlos it is very shallow for from 5 to 8 miles. Near the mouth of the lake it is very shallow, but the bottom is of soft mud. As you go beyond that point it grows deeper, and from there is deep water all the way through, from 40 to 60 feet, and sometimes 200 feet.

Q. How is the water at the western shore of Lake Nicaragua where the canal is expected to leave it?—A. It is good, deep water.

Q. In your observations there on these lakes have you seen any dangerous storms?—A. Not what you would call really dangerous. I have been out in some storms that have been unpleasant, but I do not suppose there was any great danger in them. I have been out in a tugboat twenty-four hours in one of the worst thunderstorms I ever experienced, still we managed to keep on top.

Q. It was not a regular gale?—A. No; it is not what you would call on the ocean a gale; not enough to blow the roof off any house. They have no hurricanes in Nicaragua. A hurricane would blow the roof off any house there. The tiles on the roofs there are not fastened at all, and that is one of the best proofs that they never have any hurricanes in that country.

Q. Do you think that any portion of the lake would furnish sufficient anchorage for a man-of-war?—A. Yes; anchorage enough to put all the fleets of the world in.

Q. Is the water in Lake Nicaragua clear?—A. Yes; it is good drinking water. It is considered the most wholesome water in the country.

Q. Does it ever get muddy or discolored?—A. Never, unless where there is shallow water and where the mud is stirred up. The water away from the shore is always clear.

Q. Is the water pleasant in its temperature?—A. Yes; it is very fine bathing water, yet not so cold as one of our mountain streams or lakes, like Seneca Lake.

Q. Are there volcanoes in the lake?—A. Yes; there is one volcano in Lake Nicaragua, rising out of the lake, Ometepe.

Q. About what is the height of that volcano?—A. I believe it is put down at nearly 6,000 feet.

Q. About what is its measurement across the base?—A. That I do not know. I should say it is about 10 miles through.

Q. Do people reside around the base of the volcano?—A. Yes.

Q. Is there a village there?—A. Yes; there is a village of about 1,000 inhabitants, who are mostly Indians. Some of them are agriculturists.

Q. Is the island fertile?—A. Yes; it is very fertile. They raise coffee, bananas, plantains, sugar cane, cacao, and cattle. I think that is about all they raise.

Q. So that the village there is a permanent agricultural settlement?—A. Yes. Everybody living in the village has a little piece of land outside. The Nicaraguans always live in that way. They do not live on their farms as our farmers do. They live almost entirely in the cities and villages, and they ride out and see their farms probably 20, 25, or 30 miles.

Q. Do tenants live on their farms?—A. They always have some workmen—Indians—living on their farms.

Q. Is this Ometepe volcano in action? Is it alive?—A. It has the appearance of being in action, as there is always smoke or steam rising from it.

Q. Is it smoke, or is it a cloud?—A. It is very difficult to tell. I have never seen what I would be sure was smoke coming out, although it does occasionally issue smoke.

Q. What is the tradition or reputation there as to how long it has been since the volcano was in action?—A. I never heard of its being in action at any time. It rises to a perfect cone. Most volcanoes that have ever been active have blown off one side, but there is nothing of that kind there. It is perhaps the most perfect volcano in the world, rising right to a perfect cone.

Q. There is another volcano, Mombacho, near Grenada, right on the shore of the lake?—A. That is also a live volcano in the same way as Ometepe. It is not extinct. The smoke does show, but it is almost always cloudy, so that you can not see anything. Occasionally the clouds break away, and then it appears as if there is a little light smoke or steam rising from the top. Mombacho was in action about twenty years ago, before I went there, and it frightened the people there very much. They have some earthquakes.

Q. I suppose you have experienced earthquakes since you have been living in Nicaragua?—A. Yes. The biggest earthquake they have ever had in Managua was since I have been there.

Q. Did that earthquake seem to produce an impression on the volume of water in the lake?—A. Not at all.

Q. Did it produce any real disturbance on the lake?—A. Not at all. My wife was sitting, chatting with a friend, looking at the steamer as it drew away from the dock. The steamer had gone about half a mile away from the dock when the earthquake occurred, and my wife said it looked as if the steamer stopped. When the earthquake began the lake was slightly wavy, rough; but immediately after the earthquake it was very noticeable that the lake was perfectly calm. The earthquake seemed to have had a neutralizing effect upon it.

Q. What year was that?—A. On the 29th of April, 1898. That was the hardest earthquake recorded in Nicaragua for a century.

Q. What is the general description of country between Lake Nicaragua and Brito, along the region where the canal is to be constructed?—A. The land rises from the lake from about 25 to 30 feet above the level of the lake, and from there it slips back into a low, level plain which is very swampy and which is not over 20 feet above the level of the lake.

Q. Has it a stream running through it?—A. No; it is generally a great flat plain. Then the canal follows that plain right down to where

it comes to the Rio Grande, which is nothing but a little brook. It runs down there and through the only ridge of hills which divides Lake Nicaragua from the ocean—a ridge which, in some places, rises to 500 or 800 feet high. There is a place where this Rio Grande comes into the plain and cuts through this ridge of hills. The canal follows that cut through the ridge. There is not over 58 feet at the highest cut for the canal above the lake.

Q. What is the character of the soil?—A. This low plain is fertile, soft muck. In the rainy season it gets very soft.

Q. In the other parts what is the character of the soil?—A. It is a reddish-colored soil and very fertile.

Q. Have you found any of this reddish soil on the eastern side of Nicaragua toward Greytown?—A. Yes; up in the hills.

Q. The same description of soil?—A. Yes; more or less. A kind of shaly rock was common in those little hills west of the lake. I also found the same shaly rock on the other side—rock which we could break with a pickax. There is no trouble at all about it, and they very seldom have to use dynamite. A man with a crowbar can break it up. The rock is so soft and shaly that it can be broken off in tremendous great pieces.

Q. That rock would be easy to excavate?—A. Very easy.

Q. Going on toward Brito there is a descent from the level of the lake at ordinary tide to the level of the Pacific Ocean at mean tide to the depth of about 110 feet?—A. Yes; above the level of the lake, as it is supposed to be raised by the Ochoa dam.

Q. I am speaking of the other side of the lake, the western side.—A. I do not know that I quite understand your question.

Q. The engineers have reported that the lake at mean tide at the ordinary stage of water is 110 feet above the Pacific Ocean.—A. I do not understand it that way. I understood that that is what it is supposed to be when the canal is finished.

Q. Well, say 100 feet above the Pacific Ocean.—A. About 100 feet.

Q. Of course if you make a cut from the lake to the ocean the water would pour out of the lake unless you stop it?—A. Yes.

Q. That would be stopped by a dam somewhere or else by the locks of the canal?—A. The locks of the canal would stop it.

Q. What is the condition of the country out toward Brito?—A. It descends, like any mountain or hillside, gradually into the ocean.

Q. Is that country drained by one of these little rivers?—A. By this river that is called the Rio Grande.

Q. That river does not run into the lake?—A. No; it runs into the ocean.

Q. So that when you get to the ridge of hills you strike the valley of the Rio Grande?—A. You strike the valley of the Rio Grande first. The Rio Grande comes up from another direction, like this [sketching a diagram of its course].

Q. Lying between the Rio Grande and the lake there is a ridge of hills?—A. Yes.

Q. That is the one you have been describing as about 65 feet high?—A. Yes.

Q. If you were to cut through that ridge of 65 feet until you got to the level of the ocean, for instance, you would have a tremendous current of water running out of the lake?—A. Yes. They would stop that by the locks.

Q. What is about the area of the basin of the Rio Grande where it empties at Brito?—A. I do not recollect.

Q. Is it large?—A. I made no measurement of it, but I should say it was several miles wide.

Q. So that you could excavate in that valley a basin for ships and a harbor as deep and as wide as you would want for all purposes of the canal?—A. Yes. There would be no difficulty at all in getting a basin large enough for ships.

Q. Ships could come right from the ocean to this basin and then proceed to the canal locks and be elevated there and carried over to the canal?—A. Yes. The ocean has a little bay here at Brito [indicating]. You could make the canal a thousand feet wide here, or you could make a basin for ships.

Q. You find no difficulty in the excavation of a perfectly landlocked basin there for the protection of ships?—A. As an engineer, I should not consider it difficult.

Q. Is it a mere question of money?—A. I should be very glad to take the job if you give me the money. I should not consider it as an engineering problem at all, but simply as a question of money.

Q. So that at Brito it is practicable to get a perfectly landlocked site for a harbor?—A. Yes; there is no question about it. It is much easier at Brito than at San Juan del Norte, and I do not consider that a very great engineering problem. I consider that the construction of a harbor at San Juan del Norte is simply a matter of money. My idea would be to make the river flow permanently there, and to stop it by damming. I would make the river go down there [indicating], and with that tremendous quantity of water you could keep the harbor cleaned out and open for ships of any size.

Q. Have you ever examined the railway embankment constructed by the Maritime Canal Company?—A. Yes, sir.

Q. That railway is about 12 miles long, I believe?—A. Between 11 and 12 miles; said to be.

Q. Do you know in what year it was constructed?—A. I do not know when it was constructed; I was not there at that time. I was there in 1895, and at that time it had been so long constructed that the ties were all rotten. The rails were all right, and the embankment was all right, so that we passed over the road on a hand car, though the road was in too bad a condition, owing to the rotting of the ties, to have used a locomotive.

Q. Did you go clear to the end of the road?—A. Yes.

Q. Did you examine the banks of that canal and also the embankments of the railroad to see whether or not they had been injured much or at all from the rainfall?—A. Yes; we made that examination, and the general impression of the whole party was that it was wonderful the way the embankments had withstood the effects of the heavy rains.

Q. I suppose the rains there are very heavy in the rainy season?—A. Yes. In Greytown it rains all the year round more or less. As they say there, one season is the wet season and the other is the wetter season. They have no dry season at all.

Q. And you were surprised at the preservation of the embankments?—A. Yes. The sand had been thrown up into mounds or hills.

Q. What was the color of those mounds?—A. Brown, or perhaps brownish, and slightly tinged with yellow.

Q. Was it sand or was it the detritus of volcanoes that had been brought down by the water?—A. A good deal of it was the washing of volcanic matter. It was not white sand, like the ocean sand, but was of a brownish color, and occasionally a little yellowish.

Q. When exposed to the weather it does not wash, as sand ordinarily does?—A. It is my opinion that it does not, from the fact that it had been in that condition apparently for many years.

Q. Did you notice whether the rails on the line of railway on which you traveled on the hand car were badly rusted and disintegrated or not?—A. I should say that the rails were in good condition.

Q. And yet no care had been taken of them?—A. Nothing had been done, and yet the rails appeared to be perfectly solid and strong.

Q. You found no difficulty in passing over them on the hand car?—A. None at all. We did not have to get off the hand car in that whole run of 12 miles.

Q. Was that embankment made right through the swamps?—A. Yes; right through the low level and swampy places to Greytown.

Q. Do you know anything about the characteristics of the Lake Silico route?—A. I do not know that route. We had a party of men sent over there to make measurements; but I was not in the party and did not see the lake.

Q. But you have passed across from Greytown through this Silico region on the railway?—A. No; I have not. The railroad is but just now completed. I did not go that way, and consequently have not seen it.

Q. That railroad was constructed by the Atlas Company, I believe?—A. Yes. The road has not been received yet. It has just been finished. I have not seen that little strip of land through there, and all that I know of that is from hearsay.

Q. You have not crossed that?—A. No.

Q. How does this country through which this railroad has been constructed by the Maritime Canal Company compare in appearance with the country you saw going toward the San Juan River? You were going up and down there frequently?—A. It is apparently the same kind of country.

Q. A country with lakes?—A. Lakes, marshes, and swamps. You might say it is only one swamp.

Q. Can there be any doubt that all that delta from the mouth of the San Carlos out to sea and clear around up by Greytown and back across the Deciado Lagoon was formed by the action of the washing up of the débris of those volcanoes in Costa Rica? Is there any doubt that it was formed in the same way and of the same material?—A. I think the most reasonable theory is that it was.

Q. Are there any washes from streams that come down from the hills back of Greytown that would carry in that delta there?—A. No; there is no stream of any consequence except the San Juan River. That comes directly from the lake, and it does not make much deposit.

Q. What is the direction of Deciado from Greytown?—A. It is a northwesterly direction.

Q. I will so describe it: In that country lying to the northwest of Greytown, through which this railroad built by the Maritime Canal Company runs, are there any streams coming down from the mountains that would make such a deposit as would build that country up to that level?—A. No; that does not seem possible. There is a small

stream, called there the Deciado River, but we would not call it a river in this country; we would call it a creek. We waded all along through it, though it is too wide to jump across. It is very swift, as I remember it, as it comes through the divide, and there are small falls, cascades, and rocks. It is, perhaps, 20 yards wide, more or less, but is shallow.

Q. I suppose along the course of that stream there are numbers of lagoons or marshes where the water spreads out?—A. Yes; after it comes down to the level of the lower plain there are some marshes on both sides and some sluggish streams coming in on each side.

Q. The point to which I wish to direct your attention is this: Do you believe that it was ever possible that that delta lying between the divide and the ocean at Greytown was formed by the washings from the Deciado River?—A. No. The river runs through a very rocky region, you might almost say through solid rock, so that the wear would be very little, if any. If you were to see it you would understand it. You might almost say that the river is rock bound.

Q. So that the wash from that river could not reasonably be supposed to be the cause of the formation of that delta?—A. No; it is too small a stream.

Q. Then if the delta was formed in any such way it was probably formed by the wash of the detritus carried down from the volcanoes in Costa Rica and out to sea and then blown around by the trade winds?—A. That seems to me the most reasonable theory; I can not understand how it could have been formed in any other way. The bar at Greytown has been formed, in my opinion, because the strong current of water that used to be there has been turned aside, and I imagine that if the stream had been kept a unit with its former bottom that bar would have been forced out, the water would have driven it out.

Q. So that, if I understand you, you think it is possible to make the San Juan River the real channel of the canal for some distance by confining it?—A. I believe that is possible. I have not studied the subject sufficiently to oppose my theory to that of such men as Mr. Menocal and other engineers; but from the slight inspection I made it always struck me that that canal could be built, keeping pretty close to the river, if not in the river, a great deal of the way.

Q. But having its exit at Greytown?—A. Yes; that great plain there could be cut through completely; there would be no obstruction to the cuttings; it would only be the matter of removing so much soft dirt.

Q. You have been out to the ocean from the San Juan River through that Colorado channel?—A. Yes.

Q. What would you think of the proposition of making the terminus of the canal through the Colorado River on the delta at the ocean?—

A. It strikes me that there would not be any particular advantage in that. The bar there is as troublesome as the bar at Greytown. The trouble is that the river is divided as it comes down near the ocean—part of it goes to Greytown, part of it between Greytown and the delta, and the largest body of water goes out by the Colorado.

Q. So that there are three mouths?—A. Many mouths; you might say there are several mouths at Greytown. Then there is another point: If you should force it all through one mouth, it always struck me that that would do away with the necessity of so much dredging.

Q. It is like the Mississippi River mouth, only on a smaller scale?—

A. I suppose so. I have never seen the mouth of the Mississippi; but this is a small river, and we could handle the waters of it; the waters of a stream of the size of the San Juan could be managed.

Q. Have you ever passed across by the Panama route?—A. I have been across on the railroad frequently. The Ludlow Commission spent ten days on the Isthmus.

Q. What were you doing during those ten days?—A. Inspecting the canal. We went up on a tug as far as the canal had been constructed, thence by train, and at times the train stopped and we had a chance to make some inspection.

Q. Did you go from Colon or from Panama?—A. From Colon first, and then we went to Panama and spent five or six days making an examination thereabouts.

Q. About what was the draft of the tug upon which you went from Colon?—A. That I do not remember; it was not a large tug; I should imagine the draft was from 6 to 8 feet.

Q. How far could you navigate the canal on that tug?—A. I do not remember, but we went as far as it was navigable; and I should imagine we went northward about 15 miles; we did not measure as we went; we simply rode along, making inquiries of people on board the tug and taking their word.

Q. At what time was that?—A. That was in July, 1895.

Q. You do not know whether you could go that same distance now or not?—A. No; I have never been up the canal since.

Q. While you were there did you make any examination of the dam site at Obispo?—A. No.

Q. Or at Bohio?—A. At that time there had not been much said or thought about that dam. As I now remember, in 1895 we had heard nothing about those two dams; I do not think they had discussed the question of those dams up to that time.

Q. Did you make any inspection of either of those sites?—A. We did not make any inspection at all. We simply looked at the Chagres River, the canal, and the machinery and stuff that they have on hand.

Q. What was the state of the water in the Chagres River?—A. It was very low when we were there. I never saw it in one of its torrents.

Q. Was it confined to definite channels then, or spread out?—A. It was very low at that time; you could see almost all of the bottom of its channel. It is what we would call a large creek, hardly a river. But when the water is high, as it is occasionally, it becomes a tremendous stream, widening out 3 or 4 miles on each side, overflowing everything, and is almost impossible to control.

Q. At this low stage of water that you saw in the Chagres River how would it compare in volume with the ordinary stage of water in the San Juan River between the village of San Carlos, at the mouth of the lake, and the mouth of the Colorado?—A. It is not one-hundredth part as large, possibly even less. In the first place, it is not a hundred feet wide, while the San Juan is a thousand feet wide at San Carlos; and this stream has almost no depth at low water, 2 or 3 feet possibly, while the San Juan has between 20 and 40 feet of depth. There is no comparison. The San Juan is what we in the United States would call a river; it is a stream from 800 to 1,000 feet wide, and even where it is not deep it carries a large volume of water. Of course there are bars where little streams come in, so that the navigation is somewhat

difficult. If it were not that those streams come in there would be no difficulty about navigation at all. Even where the water is rapid, where it comes down little hills there, the river is 600 to 800 feet wide, and the water is 6 to 8 feet deep right on that riffle, showing the tremendous volume of water.

Q. Could it be navigated by steam at most seasons?—A. It could be navigated always if properly channeled.

Q. Clear into the lake?—A. Yes.

Q. By vessels drawing 6 feet of water?—A. Yes; if they would take the trouble to clean out the channel. On the Machuca Rapids the river is 1,000 feet wide, and naturally the amount of water spread over that surface would be considerable. There is a rock sticking up here and there, making the rapids dangerous for navigation. We lost two of our engineers there last year, as you have probably heard. While going down in a little boat they struck a rock, which knocked them out, and Mr. Clark was thrown from the boat; his head struck another rock and killed him. I do not know whether they ever found the bodies; I think they found one. We have very little news from that side.

Q. You made an exploration of the canal on the Panama side. Did you go out on a tug then?—A. No; we did not go on a tug on the Panama side.

Q. You looked at it from the railroad?—A. Not from the railroad; we went over to the Bocha and looked generally at the excavation that had been made. There is no great amount of it there; they had excavated, as I remember it now, I should say, a mile or two, possibly not so far.

Q. To the proper depth and width of the canal, or was it just a ditch?—A. They said it was made to the proper depth, but we made no measurements.

Q. You did not take any measurements on any part of that survey?—A. Not at all, only to take a note more or less of what they had done and where, and the amount of machinery and stuff they had on hand. That seemed to be the main object, to take a general look at the place. I should not think that the Ludlow Commission made any inspection on the Panama side worthy to be put on record. I do not think that it would be quite right to put it on record, because our information was almost all from hearsay.

Q. Did you find much machinery along that Panama Canal line?—A. Yes; there were a large number of cars and locomotives and these little dirt cars, with the track that they come with. That track is made of iron or steel, I do not know which, but made all together, so that they can lay it down anywhere, with ties all fixed, in sections of about 16 feet in length, and they lay down and connect those sections. They have a good deal of that, and they have a great many dirt cars, dump cars, and a great many locomotives.

Q. And excavators?—A. Some excavators.

Q. Any dredges?—A. Yes; but I did not see any dredges that I considered to be at all the equal of what we consider modern dredges. They have one dredge now working on the Panama Harbor which I saw at the mouth of the canal when I came in this time, but I do not know what class of dredge it was. I did not see any name on it, but it struck me that we would not use dredges of that model. I think one of our modern dredges would do more than 20 of that kind.

Q. When you first went across there in 1895 with the Ludlow Commission, did you go into the Culebra diggings?—A. Yes; we went down on the train and went into the cut.

Q. Did you go into the Emperador cut?—A. Yes; we stopped at several places, and I imagine that was one of them. Possibly I was not there. Possibly I stayed at one point for purposes of examination and another party went over there. I imagine that somebody must have been sent over to examine it.

Q. When you first went there, about how many hands were employed on that canal where you saw it, say in the Culebra cut?—A. I could not count more than a hundred at the most at any one place, and it would be difficult to count that many at one time. At times when we stopped we saw a few men. I should say now that there might have been a thousand men working within a mile or two around the Culebra cut, but there were not more than a hundred in sight from any one point.

Q. When were you there last?—A. Just now.

Q. What date?—A. May 23, 1900.

Q. You took a look at it?—A. Yes. There is a station at Culebra. I got out of the train and went and stood on the edge of the cut until the train started. We stopped at least five minutes there, and I tried to get an approximate idea of how many men there were. As I said before, I could not see more than a hundred from that point, but I found that they were working for about 2 miles along there near that Culebra cut. Possibly there might have been a thousand men altogether, but I doubt it.

Q. Could you note, in the five years' interval between 1895 and 1900, that any considerable progress had been made?—A. Yes; in Culebra cut I could see that there was quite a difference just in that one point, but that was the only point where I saw any difference at all.

Q. Was that the point at which they seemed to be directing their efforts mainly?—A. Yes; entirely. They seemed to be focusing all their efforts on that point; they had work trains at work there, and I saw about a hundred men, as nearly as I could tell, working with pick-axes and shovels, excavating and loading cars to carry the stuff away. The whole amount of their work seemed to be at that point, so far as I could see, and they have done absolutely nothing anywhere else. I think they are trying to make a very strong impression at that point. That is the most noticeable place on the whole line. Traveling on the railroad as we did, we had a good chance to see and note what was being done. It strikes me that their great idea is to make an impression right there.

Q. Did you observe any work being done at any other place on that canal?—A. Nowhere else except within 2 miles of the Culebra cut. I did not see any work anywhere else.

Q. Did you observe it from the windows of the car, or how did you make your observations?—A. I got out of the car when the train stopped at Culebra about five minutes, as I said, and I stood on the edge of the cut.

Q. Judging from your observation, what depth should you say they had carried that cut below the line of the railway at Culebra?—A. I should judge it was about 30 or 40 feet below the line of the railroad; I did not measure it; of course that is only a rough guess. This picture you have here is very good, representing the condition at Culebra.

Those other views you have I could not identify, because there are many places having a very similar appearance.

Q. (Exhibiting photograph No. 3.) Is that the one you are speaking of?—A. Yes; that is the cut. Here [indicating] is the point from which I viewed the cut standing, and from this point [indicating] is where I viewed it from the car window.

Q. (Exhibiting photograph No. 1.) Perhaps you can more completely identify it from this photograph?—A. I think this view was taken looking northeast, because that high hill is on the right.

Q. No. 3 looks from west to east?—A. Yes.

Q. And No. 1 from east to west, if I understand?—A. No.

Q. But they represent the same area?—A. The same cut.

Q. So, looking from east to west in No. 1, the railroad would be up on the right, on the side of the hill, would it not?—A. It would be over on this hill [indicating].

Q. No; looking the other way it would be there [indicating].—A. I think this is going from Panama to Colon.

Q. You can see the railroad track?—A. Yes; but the railroad is not visible from this point [indicating]. The railroad comes around behind this hill [indicating], and there comes in sight again at that level spot. There we came from behind the hill, around in there [indicating], and came into view of the cut again. No. 3, I should say, is looking easterly—of course, not directly east—looking from Panama to Colon.

Q. And in No. 3 your train would be on the right side of the picture?—A. No; on the left.

Q. Did you observe any sheet of water as you went along the line?—A. There is muddy water, for it had been raining a few days. That picture represents it very well. There is a deep cut there [indicating] that is partially filled—to the depth of a foot or two, I should say.

Q. Taking your general observation of the two routes, the Panama and the Nicaragua, which should you say would have the preference, first in respect to cheapness of construction?—A. I should say that the Nicaragua route would cost at least \$20,000,000 less than the Panama.

Q. Then, as to the certainty of water supply?—A. The Nicaragua route has the advantage there, without any question. I consider that the Panama route is entirely possible, with the only doubt that at some time during the year it would not have water enough. I have spoken of the supply of those two lakes, Bohio and the other lake, but I have not calculated the amount of water in the lakes going to waste by evaporation. But in Nicaragua there can be no question at all.

Q. Do you concur with other engineers in the opinion that there is water enough coming out of those lakes in the ordinary course of the run of the San Juan River to supply a canal of the large size necessary for ships of commerce?—A. Enough to supply twenty canals. In the case of Nicaragua there is no question about water supply. That has already been solved by the Creator. I do not think any engineer could have any question about the sufficiency of the water supply there.

Q. The only question about it is in cutting to the level of the river and the level of the lake, whether you shall have one dam, or two, or three?—A. Yes; it would be a question of engineering only. But I believe the canal can be built for \$20,000,000 less than the Panama Canal, although I am a thorough believer in the feasibility of the Panama Canal. I believe you can turn the Chagres River, but how are

you going to supply your canal? That is the problem there. I imagine that the engineers who have studied and planned for the dams at Bohio and Alhajuela must have made their calculations upon some solid basis, and that that plan is feasible. But that problem is entirely removed from the Nicaragua. We have so much water there the only question is what are we going to do with the water.

Q. From your examination of the San Juan River from the Colorado to the ocean, from your knowledge of the country, and from your examination of the line from Greytown out to the divide on the line projected by Mr. Menocal, and partly worked by the Maritime Canal Company, have you any doubt that that portion of the canal which lies between Greytown and the point at which the canal would strike the San Juan River is available for a safe canal, as to its embankments?—A. None whatever. I see no engineering difficulty there at all.

Q. When were you appointed consul at Managua?—A. I was appointed by the President on the 15th of October, 1897; I was confirmed by the Senate in January, 1898. I do not remember the date, but my commission was signed, I believe, on the 12th of January, the confirmation having been, I think, two or three days before.

Q. What articles comprise the chief exports from Nicaragua?—A. The chief article is coffee.

Q. Is it of good quality?—A. Very good quality.

Q. Sells for good prices in the markets?—A. In the European markets, yes. In the United States there does not seem to be any market for the Nicaraguan coffee; it is not known here. I do not believe there is any better coffee anywhere.

Q. Is Nicaragua a good coffee-growing country?—A. Yes; they get good crops. The fact is that the coffee grown in Matagalpa last year, received the highest price paid in London for any coffee.

Q. That Matagalpa country is settled largely by white people?—A. By Americans. There is a large American colony there, about eighty families, all engaged in the coffee business.

Q. Is that a good country?—A. A lovely country, with splendid climate, and cold at night.

Q. Are those American people there contented and prosperous?—A. They are pretty well satisfied. The most of them are men who came there without much capital, and have had to struggle along the best they can while waiting for the coffee trees to grow up. But that struggle is now passed, and their trees are beginning to bear. The Government is doing all it can to help that community in the way of securing means to get their coffee out of the country. That country is a hundred miles from the railroad, and they have to take their coffee down to the railroad by mules and on ox carts, mostly by mules.

Q. Is the country between Matagalpa and the coast a comparatively smooth country?—A. Yes; the town of Matagalpa itself is in the mountains, about 2,100 feet above sea level. The coffee country is mostly high up on the sides of the mountains, sometimes as high as 4,500 feet, and the very finest coffee raised in Nicaragua is raised at an elevation of about 4,000 feet, and is raised by Americans and Englishmen. An English firm by the name of Potter Brothers got the very highest prices last year for their coffees. They are very large coffee growers. I think they have shipped this year about 2,000 quintals, that is about 2,000 sacks of 100 pounds each.

Q. About 200,000 pounds?—A. Yes; that firm received last year, in the London market, 96 shillings for one cargo, and 104 shillings per quintal for another cargo, 96 shillings being the lowest price they received.

Q. One hundred and four shillings per quintal was the largest price paid in London for any coffee?—A. That was the largest price paid in the London market for coffee from anywhere in the world.

Q. What is the port whence this coffee is shipped?—A. Corinto; it is carried by railroad to Corinto.

Q. Is there any other extensive port in Nicaragua from which shipments are made to foreign countries?—A. On the Pacific coast there is Corinto and San Juan del Sur; San Juan del Sur is a small place, but we have a consular agent there.

Q. What is the central point of concentration for exports that pass out from the San Juan River into the Caribbean Sea?—A. Granada.

Q. What proportion of the exports from Nicaragua is carried from Granada?—A. I am unable to answer that, because I have not figured it out. But from Granada almost everything that is shipped goes to the United States. That makes it a very important place for the United States.

Q. That comes out from the San Juan River?—A. Yes.

Q. And the transportation is furnished by the Atlas Company?—A. The transportation is furnished by the Atlas Company directly from Granada to New York.

Q. That Atlas Company is a British company?—A. Yes.

Q. So that that British company has a monopoly of the transportation from Granada to New York?—A. Yes.

Q. About what proportion of the productions of Nicaragua that are exported pass through Granada?—A. That would be pretty hard to guess.

Q. Is the proportion as great as from Corinto and from San Juan del Sur?—A. No; from Bluefields to the United States is the greatest, of course. Everything is American there. They send a great many bananas, but all the coffee, with small exceptions, goes through Corinto. A great deal of rubber, hides, and things of that kind go out of Corinto, and some logs, mahogany, cedar, and rosewood. Bluefields is also the greatest shipping point for mahogany and cedar. The Emery Company do all their work through Bluefields; that is the greatest mahogany operating company in the country. I should judge Corinto to be the largest exporting port, even larger than Bluefields, exporting to all parts of the world. It would be impossible for me to give the figures as to the proportion without access to the annual report that I have sent to the State Department.

Q. Do you think that as much as one-half of the productions of what we may call West Nicaragua pass out from Granada?—A. That would be true, with the exception of the Bluefields banana trade, which is tremendous.

Q. I am excluding that by my question.—A. Almost all of the coffee from the western part of Nicaragua goes out at Corinto. I should suppose only about 5 or 6 per cent goes through Granada.

Q. By Western Nicaragua, you mean that part of Nicaragua west of the lake?—A. Yes. All that is the coffee region.

Q. I will put the question in a different form. Are the productions of what you call Eastern Nicaragua shipped through Granada? Is the

amount or value as great as in the case of the productions that go out through Corinto?—A. No.

Q. So that Granada is not so important a shipping point as Corinto?—A. Not at present, owing to the difficulty of getting over the Greytown bar. Otherwise it would be a greater shipping point, because of the saving of freight. But that difficulty is such that they never can tell when they are going to get freight out or in. Granada would have nearly the whole commerce of the country, if the Greytown bar did not prevent it.

Q. Have you any doubt that, if we had a canal through Nicaragua and Costa Rica, the United States would receive the bulk of the trade from both countries?—A. The United States undoubtedly would. The United States this year received a larger proportion of the trade of Nicaragua than any other country. We first made that record in 1898. For 1899 I have not yet been able to get the figures. In 1898, for the first time, both our imports and exports for Nicaragua exceeded the trade of Great Britain, France, or Germany. In case the canal is built, so that goods can be shipped directly to New York without transshipment, delays, and difficulties, in my opinion, there is no doubt but the United States would get almost all of it. They say that the reason why they send their goods to Europe from Corinto around the Horn is because the freight is only about one-half of what it is to New York. They send freight direct to Hamburg, without transshipment, by steamer lines. The Pacific Navigation Company, an English and Chilean line combined, carry freight from Corinto to Europe for just one-half of what it can be carried to the United States. That is one of the great reasons why there is not more trade with the United States, and that difficulty would be removed by building the canal.

Q. What is the general character of the country eastward from Lake Nicaragua to the Caribbean Sea? First, is it inhabited?—A. No; it is nearly all forest.

Q. Is it capable of being inhabited?—A. Almost all of it is rich and fertile. The only reason it is not inhabited is that there is no way of getting to it and away from it.

Q. What is the general character of the forests?—A. Heavy; abounding in mahogany, cedar, rosewood, ebony, and fine lumbers, the names of which I do not know. Fine hard woods are found.

Q. Logwood?—A. Yes; woods that are good for construction purposes, for furniture, for railroad ties, for piles, and things of that kind. I know the Spanish names, but not the English names, of many woods, for instance, guiliguiste; another Spanish name, the English equivalent for which is black wood, very similar to our iron wood in this country, only the trees grow larger, and that is a very splendid timber for railroad ties. When it is dry it is so hard that you can not drive a nail into it at all, and there are several other kinds of wood the English names of which I can not give.

Q. Practically, the country lying to the eastward of Managua, in Nicaragua, then, is a country that is habitable?—A. Yes. They can raise coffee, rubber, and chocolate. It is good pasture land, and they can raise sugar cane. They raise coffee in the hill country. Both coffee and rubber grow high, not on the sea level. Then the level plains are pasture lands, and sugar cane grows very well; also chocolate grows well in the low country, but the low country is almost all habitable.

Q. Is it a good rubber country?—A. Splendid. It grows naturally. The cutting of natural rubber trees growing in the woods had become a regular business, giving occupation to hundreds of men every year; but finally the Government made a law against it, because those fellows who did not own the trees were killing them. So a law was passed that they should not cut any more rubber for ten years. That was four or five years ago. I do not know whether the law is still enforced or not.

Q. Is that a well-watered country?—A. Splendid. The east side is much better watered than the west side. It always seems strange to me that people should be content to live where they have six months of dry weather and six months of wet, instead of living across the lake, where the climate is like our summer here all the time—rain sometimes and dry sometimes. The rivers over by Managua are dry six months of the year—not a drop of water in them.

Q. The course of the San Juan River, if I understand it, is nearly northeast?—A. Yes, about; a little north of east.

Q. To the northward of that river, and as far north as the upper Lake Managua, that area, if I understand you, except as to the Matagalpa part of the country, is practically all forest?—A. Yes. I will qualify that statement a little. In that part of the country in the neighborhood of Lake Managua, the Pacific Ocean, and the San Juan River is inhabited; they have cattle ranches. It is not really cultivated, but it is not exactly in its original wild state.

Q. But with that exception the main body of the country out to the Caribbean Sea, lying eastward of Lake Managua and Lake Nicaragua, is forest?—A. Yes. Not only that, but all along the coast to the Honduras border that whole country on the east is uninhabited up to the present time, almost a wilderness. I do not mean to say that there is not a single cultivated estate there, but if you will look on the map it will appear to be all forest, no cities or towns of any consequence.

Q. Are there any Indians in that country?—A. Yes; along the river banks.

Q. What are the characteristics of the Indians as to docility?—A. They are a docile people.

Q. Are they disposed to work when they have opportunity?—A. Very little.

Q. Are they agriculturists?—A. Yes; they live upon fruits, bananas, and the vegetables around their houses.

Q. As to the fruits of Nicaragua, from the Pacific to the Atlantic, I suppose they are indigenous?—A. Yes; many of them.

Q. What are they, principally?—A. There is the orange, the same as in any tropical country—a great many oranges; a great many limes; no lemons at all; they raise the pineapple now, but I do not suppose that is indigenous; I suppose that is cultivated. They have the mango, the mamai, the zapote, the nispero, the mamoni, which is like the plum; then the jakote, the guava, and many others that I can not remember now. Those are the common ones that grow everywhere.

Q. I suppose that they have no peaches or apples?—A. No; they are not cultivated at all.

Q. Cocoanuts?—A. Oh, yes.

Q. They abound?—A. Yes; everywhere they have cocoanuts. Of course they raise them mostly on the sea level and around near the lakes, but at the same time they can grow them up on the mountains, though not quite so well.

Q. How is it as to corn?—A. Good. That is a rich corn country, so much so that they do not cultivate it to any extent, and they never fertilize the ground at all; that is unheard of. A great many of the people do no more than to go through the fields with the machete and cut down the weeds and grass and little shrubs that grow up during the rainy season, before they want to plant, cutting down these things while they are dry—they are dry and dead during the dry season—and burning them on the ground; and then afterwards they go around with a sharp stick, make a hole in the ground, and stick the corn in, and that is all they do toward cultivating the ground in many places, and yet it makes a good crop. In other places they plow; that is, they do not use what we would call a civilized plow, but they hitch a team of oxen to a long beam brought to a point, that point being oftentimes covered with iron nailed on, and that they use as a plow.

Q. Do they plow with oxen?—A. Yes; but their plowing simply means to root up things.

Q. Do they raise mules in that country?—A. Yes.

Q. Are they pretty good animals?—A. Yes; very good mules. They depend upon their mules to get their products out of the country, when they do not live on the rivers or railroads; but they never use mules for plowing; they use oxen. Mules are used for pack animals and for riding purposes. Many planters claim that a mule is a better animal for riding purposes than a horse, being more sure-footed.

Q. Taking it through and through, is Nicaragua extensively engaged in growing sugar?—A. Not extensively. In 1898 they exported about a million pounds of sugar and supplied the country.

Q. Does sugar grow well there?—A. Yes. But before 1898 they did not even make their own sugar and did not export any of any consequence. They are increasing in sugar. The coffee business has been bad of late years, on account of lower prices and bad seasons; and so many men have gone into sugar raising instead, and many others have gone into the manufacture of rum—what they call “aguardiente.”

Q. Is there any cultivation of rice in that country?—A. Yes.

Q. Is it cultivated by the natives or by Chinese?—A. By the natives. There are no Chinese there, except a few merchants; they are not allowed to come there any more.

Q. Any negroes?—A. A good many negroes on the eastern coast—Bluefields and Greytown.

Q. Emigrants from Jamaica?—A. Jamaica mostly.

Q. As to the health of Nicaragua, first taking the lake on which you have been living so long: How do you consider the health of that part of the country?—A. I consider it a perfectly healthful country.

Q. How is the valley of the San Juan River?—A. Of course in those low swampy lands I do not believe it could be otherwise than malarious, although our engineer party is working there, and their experience shows that it is no worse than other low countries, and perhaps quite as good as other countries, owing to the tremendous rainfall which does not allow the water to stagnate. Greytown is one of the most healthful places I have ever seen, and it is surrounded by swamps.

Q. Do you not think the trade winds have something to do with that?—A. Yes; I do.

Q. Do those trade winds blow during the entire year?—A. No; during the rainy season they do not blow, but during the dry season they

do; and during the rainy season the water washes away everything that has accumulated during the dry season.

Q. Is that a strong wind?—A. It is a steady wind; it blows so hard that it blows the dust in your eyes and makes you hold your hat on as you go around the corner.

Q. It is a good wind for navigators?—A. Oh, yes; it is what you might call a spanking wind, a good wind to drive sailing vessels, and sometimes raises pretty rough waves.

Q. What is the distinction, in point of time, between the wet season and the dry season? Which is the longer?—A. They are of almost the same length in the interior. In Greytown the wet season continues almost all the time.

Q. But they have the trade winds there?—A. Yes; though it is quiet, often a perfect calm, when it is raining there.

Q. Do you mean that the trade wind stops blowing while it is raining?—A. It seems to. I have often wondered if this is not the correct theory: That the annual trade wind, coming saturated with water from the ocean on the northeast, striking against the current of hot air from the land, neutralizes it and causes it to discharge the water.

Q. Do you mean this: That while it is raining the trade winds will not blow?—A. Often it is perfectly quiet, almost always.

Q. And then as soon as the rain is over the wind will spring up?—A. It will rise a great deal.

Q. On the same day?—A. On the same day, and then again it will be quiet and calm.

Q. When the calm occurs it is only during the time that the rain is being discharged from the clouds?—Yes.

Q. The wind follows that?—A. In Managua—and I have lived there longer than in other places in that country—as soon as we feel the trade wind blow we know there will be no rain. If we get up in the morning and find it quiet we expect rain.

Q. The point I want to get at is this: Whether the trade wind blows all the time during the year?—A. Yes; there is no twenty-four hours that the wind is not blowing more or less—that is, the trade wind from the northeast. The trade winds generally prevail during the entire year, but not always with the same degree of force.

Q. I suppose your travels with the engineering parties you accompanied through the San Juan region have given you an opportunity to be stricken with any of the diseases of that country?—A. Yes; I have had plenty of opportunities. I have slept in all sorts of places.

Q. Slept in wet clothes?—A. I will not say I slept in wet clothes, because I always carried a bundle wrapped in rubber, so that I could have something dry to wear for the night. I have gone all day in wet clothes, have put on wet clothes in the morning, and have done so for months at a time; but at night I have always had dry pajamas to get into and a dry blanket, which I kept rolled up in a rubber sack.

Q. That was during your engineering work?—A. Yes.

Q. Were any of your party troubled with malaria or chills?—A. Nobody in our party had any sickness at all. We had 10 Americans in the party, besides natives.

Q. Taking Nicaragua from ocean to ocean, would you be willing to say that it is a healthful or an unhealthful country?—A. I should say that the country is perfectly healthful. The only unhealthful places are the cities, and that is owing to their filthy conditions.

Q. You have a family of children?—A. I have three children.

Q. And they have been brought up in that country?—A. They have been in better health in that country than when they were in New York. My youngest little girl in this country had a bronchial trouble after she had had the whooping cough in New York at the age of 3, and naturally I felt somewhat anxious about taking her to Nicaragua. But she has come back to New York and is to-day one of the strongest little girls you ever saw—at the age of 8 now.

Q. Taking Nicaragua from ocean to ocean, through and through, you would say, I suppose, that it would be a very valuable country in the hands of people who had any industry and thrift?—A. Yes. By nature it is a rich country and perfectly healthful. There is nothing under the sun they need there but industry. It would make a fine country to live in.

Q. For small farmers, particularly?—A. Yes. You can get a splendid climate there by going up 2,000 feet, where you would not suffer from heat at all. It is only in the low country where you suffer. I have suffered much more in New York from heat than I ever have in Managua. There is nothing the matter with the country; there is nothing the matter with the climate; the whole difficulty lies with the people. They are too easy-going; they take life very easily.

Q. When you speak of the natives, do you include the Spanish population?—A. There is a very small proportion of them who are of pure Spanish descent. They all fall into these easy-going ways; they do not work hard themselves, and do not want anybody else to work hard. It is always "Mañana." They never do to-day what they can do to-morrow. But the people are good hearted and friendly, so far as I have been able to find out, and very friendly to foreigners who like them. If foreigners come there and abuse them no doubt they curse them back again. But in my experience of five years in Nicaragua I have never had a trouble with those people, because my theory always has been to treat them well, and if I do not like anyone I do not let him know it. I do not believe in going to that country and scoffing at them. That is just the reason why they are unfriendly to foreigners, because it has been altogether too customary for foreigners, and I include our own countrymen, to call them greasers and dirty pigs, and to say they don't like the way they live. My theory is that you do not need to tell them your dislikes, and you do not have to live there if you don't want to.

Q. I suppose there is a class of population there who are very cultivated and elegant?—A. Oh, yes; the descendants of some of the old immigrants are very finely and well educated in the United States and Europe. The children are always sent to the United States or to Europe for their education. I have in mind one old gentleman who has sent five sons abroad to be educated, and he has paid for their education from the proceeds of his coffee plantation. He planted his own coffee trees forty years ago, and to-day he has one of the finest coffee plantations in the country.

Q. I suppose there is no manufacturing there?—A. No; except they make sugar, ice, and rum. In Managua they have an ice manufactory. They only do a little hand weaving for cloth, but nothing of any consequence—not even a hundredth part of what they use in the towns.

Q. What is the financial condition of Nicaragua? I speak first of its public debt. What is about the amount of that?—A. It has a very small public debt.

Q. Is that held at home or abroad?—A. It is held abroad—mainly in England. Its public debt is less than \$2,000,000, gold.

Q. Of course the interest on that is paid in gold?—A. In gold.

Q. Is it paid promptly?—A. Yes; they have paid it every year up to date.

Q. What is the currency of the country?—A. That is paper.

Q. When was that instituted as currency?—A. It came in after the war of 1896. It began gradually to take the place of silver, until to-day there is scarcely any silver in the country at all. It has been shipped out. Of course there are some people who have kept silver—banks and private parties. The banks always keep some silver, but it is at a premium.

Q. Do they have silver coinage of their own?—A. Small coins; nothing higher than the half dollar. They have 20-cent pieces, half dollars, 10-cent pieces, and fives.

Q. What do they rely upon for the dollar coinage?—A. Upon the Peruvian and Chilean sol; also the Guatemalan peso, which is silver.

Q. Have they the Mexican dollar?—A. Very few of them.

Q. Or the American dollar?—A. I have never seen there an American silver dollar; I suppose it is too valuable.

Q. What is the value of the Peruvian dollar?—A. The Peruvian dollar is worth 43 cents in our gold; I think ours is worth 48 or 49 cents. We see very few Mexican dollars there, for the same reason. The Peruvian, Guatemalan, and Honduras coins are the only coins they have, and those are 50-cent pieces.

Q. When you come to the price of the paper currency of the country, is it based on gold or on silver?—A. In gold. Exchange is always in gold. United States silver is out of the question. We have only two kinds of money to consider there. One is gold and the other is paper.

Q. Then the difference, of course, is the same as between the paper dollar, we will call it, and the American gold dollar?—A. Yes; that is the difference we always consider. Exchange at 150 means gold.

Q. The paper is worth about 40 cents on the dollar?—A. Yes.

Q. Is this paper issued by the banks or by the Government?—A. By the Government.

Q. Have you any of it with you?—A. Yes. I hand you a 20-cent piece of the paper money of Nicaragua.

[A facsimile of a Nicaraguan paper 20-centavo piece, omitted in printing.]

Q. This is signed by the President of Nicaragua?—A. Yes. That flourish around the signature serves the purpose of informing the population who can not read or write that that is the President's signature. He always has that mark around his signature.

Q. Is any paper money issued there except with the President's signature?—A. No. I will qualify that statement a little. The London Bank of Central America does issue a little paper money, but it is not current at all. Their bills are not in circulation generally. Their bills are considered the same as silver, and the bank has to pay in silver any bill that is presented with a request for payment.

Q. This note you have handed me is a treasury note, as I understand?—A. It is a treasury note.

Q. Signed by the President and issued directly from the treasury?—A. Yes.

Q. Is the business of Nicaragua carried on chiefly with this kind of money?—A. Entirely.

Q. The Government officials and the troops are paid with it?—A. Yes; all Government officials are paid in this money.

Q. Is it receivable for customs dues?—A. Customs dues are paid in paper money at face value; salaries, customs, everything of that sort are always paid in paper at face value.

Q. So that the entire paper currency of Nicaragua is treasury notes issued by the Government?—A. Yes.

Q. About how much of this money is outstanding?—A. I could not tell you. If you want me to guess, I should say probably three or four million dollars. Of course that is an entire guess.

Q. Has the treasurer of Nicaragua any equivalent sum for the redemption of this currency?—A. He has nothing at all.

Q. So it rests upon the taxing power of the Government and upon the revenues derived from imports and exports?—A. Yes.

Q. Do they charge an export tax?—A. Yes; coffee has to pay an export tax of two paper dollars per sack.

Q. What is the export tax on sugar?—A. I do not know as to sugar. Coffee is about the only thing that is exported except mahogany, which pays an export tax of \$2 a log.

Q. What is the general feeling in Nicaragua in regard to a canal in that country?—A. They are very desirous generally of having a canal; there are some exceptions; a few semiignorant coffee planters are opposed to it. But the Government officials, the Government itself, and the whole country in general are very much in favor of it; in fact, they look forward to it as their only hope of ever getting on a good footing. They know that they have this money floating without anything to back it, and they are looking forward to the canal in the hope of getting something to back it, knowing that something will be paid to the Government for the canal rights.

Q. At the present time there is nothing at the back of this paper money except the bayonet and the tax collector?—A. And the hope of the canal. I believe to-day that if the United States Government should decline to buy the concession and to start to build the canal the price of money would go up 500 or 600 per cent; I mean that the price of gold would be at a premium of 500 or 600 per cent.

Q. And ruin the Government?—A. Possibly. I do not know how the Government would ever get through.

Q. And would not such a determination as that also throw the whole of the five Central American States into a condition of panic and bankruptcy?—A. Undoubtedly. They are all in bankruptcy now, nearly, with the exception of Nicaragua and Costa Rica; I think those are the only two States that pay their debts. Costa Rica, I believe, is paying pretty well, but Honduras and Guatemala have been bankrupt entirely for two or three years; they can not pay their officers and their army.

Q. Then, I suppose, you think that the Government of Nicaragua would receive the approbation of the people in making any just arrangement with the United States Government for the building of the canal?—A. Yes.

Q. They know the impossibility of building it themselves?—A. They can not do it themselves.

Q. And Central America in combination can not do it?—A. No.

Q. And Central and South America in combination can not do it?—A. No.

Q. And Central and South America and Mexico in combination can not do it?—A. No.

Q. So that it comes down to the proposition whether the United States will build it?—A. Yes. That is their desire. I know that the desire of President Zelaya is to treat directly with the United States Government. He has told me so fifty times.

Q. Have they any apprehension that we shall appropriate their territory after we build the canal?—A. Some of the ignorant people have, but not as a rule.

Q. Have you discovered any apprehension of that sort among the ruling authorities?—A. No. On the contrary, I have heard one of the ministers of the Government make a rousing speech in favor of the United States building the canal, and there was a great hurrah for the day when the Stars and Stripes should be swinging over their territory. I heard one of their own ministers say that in a speech at the time General Alexander was there. They were feasting him, and this minister very much surprised the Americans especially. We did not expect to hear anything like that. He was an educated man—educated in the United States. A great many of them are educated in the United States, and there is one thing very notable, and that is that there is not a boy sent to school or college in the United States who does not come back a good, loyal American, and he stays so for years and years, always ready to shout for the United States at any time he gets a chance. That serves to show the influence of our schools and colleges in making good Americans of those people. When they come here to school they would stay here if they could. The only trouble is the difficulty in supporting themselves here, and so they have to go back.

Q. Do you think of anything else you would like to state?—A. I do not. I think we have covered the ground pretty thoroughly.

Q. There is one thing more I will ask you: Have you made any investigation of the mineral deposits of Nicaragua?—A. I have never made any personal investigation.

Q. Have you acquired information in that regard from sources that you deem authentic?—A. Yes; I have made inquiry of other engineers and other people with whom I am personally acquainted.

Q. Are you satisfied that you have a pretty correct idea of the gold deposits of that country?—A. Yes; I have visited some of the mines; I know where the mines are. And then I have information from others as to the localities of gold deposits where I have never been.

Q. Are there other mineral deposits in Nicaragua besides gold?—A. Nothing of any importance.

Q. No silver mines?—A. There is a little silver sometimes found with the gold, but the amount is so small that it is not worthy of notice.

Q. Is it believed by those who have been prospecting and making examinations to be a gold-bearing country?—A. Yes.

Q. In workable quantities?—A. Yes. To prove that I will mention a case which is just occurring there now: The Emery people, who have always been mahogany men, have gone into the mining business also. After a thorough investigation of the Matagalpan region they have bought some old mines that had been worked by very primitive methods, without machinery and apparatus, and which consequently did not pay for that kind of ore. They are now putting in very expensive machinery, and have employed an expert from the United States, who has figured that there is \$2,000,000 in sight in their mines; and on the

strength of that report Mr. Emery has ordered fine mining machinery, and they are going into the mining business on a large scale.

Q. In what part of Nicaragua are these mines located?—A. It is in Matagalpa, near the city of Matagalpa, about 20 miles northwest.

Q. Does Mr. Emery reside at Matagalpa?—A. No; he resides in the United States, in Boston.

Q. Where does his company get its mahogany?—A. Down on the Atlantic coast, down toward Bluefields; but on the Rio Grande is where their operations are most extensive.

Q. That is a different Rio Grande from the river of the same name that has been mentioned here before?—A. Yes. They have three or four Rio Grandes—one on the northwest coast of Lake Managua; one west of Lake Nicaragua, which the canal course runs into, and they have the great Rio Grande, which is really navigable for a hundred miles and is larger than the San Juan River.

Q. It empties into the ocean at or near Bluefields?—A. About 50 miles north of Bluefields—about halfway between Bluefields and Honduras. Then there is another, the Rio Cocoa, which is a large river, navigable for 150 miles.

Q. Is all that country on the Rio Grande and Rio Cocoa practically a wilderness?—A. Almost entirely so.

Q. A rich country with valuable timbers?—A. Yes; with good soil and with mineral deposits in some parts. There are very few inhabitants along the Rio Cocoa, and no towns except a few on the coast. There are a few little Indian settlements back in the country. There is an area of more than 20,000 square miles without a town. I have prepared a map, which I submit, in order to show the location of these mineral deposits. It is so marked as to indicate the gold region and also the known mines of the country.

The committee adjourned to meet at 10 o'clock a. m. June 8, 1900, at the office of Rear-Admiral Walker, in the Corcoran Building.

FRIDAY, *February 3, 1899.*

TESTIMONY OF WILLIAM B. SORSBY.

WILLIAM B. SORSBY, having been duly sworn, testified as follows:

Senator MORGAN. State your place of residence and the business in which you are now employed.

Mr. SORSBY. My home is in Clinton, Hinds County, Miss. I am at present United States consul at Greytown (San Juan del Norte), Nicaragua.

Senator MORGAN. How long have you been in the consular service?

Mr. SORSBY. I was in the consular service four years under the Harrison Administration, and I have been in the service thirteen months under this Administration. I was four years in Ecuador under the Harrison Administration, and I have been thirteen months in Nicaragua under the present Administration.

Senator MORGAN. Do you speak the Spanish language?

Mr. SORSBY. Yes, sir.

Senator MORGAN. When did your term of service in Nicaragua commence?

Mr. SORSBY. I entered on my duties on the 1st day of January, 1898.

Senator MORGAN. I will get you to give a description of the soil at Greytown and surrounding it, the material of which it seems to be formed, and also the present condition of the harbor there, and of the outlets between the harbor and the sea.

Mr. SORSBY. The formation is of a volcanic nature.

Senator MORGAN. It is sand?

Mr. SORSBY. Coarse black sand.

Senator MORGAN. Is the formation firm and solid or easy to move about by wind and waters?

Mr. SORSBY. The formation on what is called the mainland is compact and firm—solid—and rain and water seem to have no effect upon it.

Senator MORGAN. Is that the nature of the soil in the vicinity of Greytown leading toward the hills?

Mr. SORSBY. Yes, sir. The piece of canal cut by the Maritime Canal Company, nearly a mile in length, passes through that character of soil as far as it goes, and the banks are standing to day as they were when they were first cut, without any indication of caving or falling down. That seems to be true of the whole district so far as I have seen it. The banks of the lagoons around there have the same appearance. The lagoons are all deep and the banks abrupt. The bay seems to be filled up, and in many places it is quite shallow. The entrance to the harbor is subject to sudden and frequent changes. That is all sand.

Senator MORGAN. Of the same description?

Mr. SORSBY. Yes, sir; of the same description. The present condition of the harbor is bad. The outlet to the sea is through narrow channels of the harbor. The whole bay and harbor is entirely of sand. There is no rock or other hard or dangerous substance. As an indication of that it is a common thing for the boats, the small steamers going in and out, to touch on the bottom and remain for a day under a full pressure of steam, trying to get off without any injury to the bottom of the boat except the wear from the sand. That is true of the harbor itself and of the bar.

Senator MORGAN. You speak of only one outlet. Is there not more than one outlet?

Mr. SORSBY. As I said previously, it is shifting.

Senator MORGAN. But there are several outlets, through which vessels of larger or smaller draft come in?

Mr. SORSBY. Yes, sir. The principal one in use is Harbor Head.

Senator MORGAN. Is that to the eastward or westward of Greytown?

Mr. SORSBY. It is to the north. It is northeast.

Senator MORGAN. Yes; northeast. The coast there runs in what direction?

Mr. SORSBY. It runs east and west.

Senator MORGAN. Then, of course, Harbor Head ought to be east of the town?

Mr. SORSBY. My house is built directly south and north, and Harbor Head is almost directly in line. It is a north direction from my house—just to the right.

Senator MORGAN. The coast must curve there, then?

Mr. SORSBY. Yes, sir; it does.

Senator MORGAN. The material point I wanted to get at is whether there is more than one outlet from the harbor of Greytown to the sea, and where those outlets are located. Is there more than one?

Mr. SORSBY. Yes, sir.

Senator MORGAN. How many are there?

Mr. SORSBY. There are a number. They are constantly opening and filling—shifting. The best outlet that I have seen there, when it was open, was at the old pier of the Maritime Canal Company. I have been out by that pier several times, and they seemed to have less difficulty in getting out. The bar seems to be more narrow there than it is at Harbor Head.

Senator MORGAN. Is that pier still standing?

Mr. SORSBY. Yes, sir; it is in good condition.

Senator MORGAN. And it is in good condition?

Mr. SORSBY. Yes, sir.

Senator MORGAN. On the windward side of it, what is the situation? Is the sand banked up against it?

Mr. SORSBY. On the windward side of it and for a considerable distance east the sand has banked up and formed considerable high ground.

Senator MORGAN. Clear out of the water?

Mr. SORSBY. Oh, yes, sir.

Senator MORGAN. Now, on the leeward side, what is the situation?

Mr. SORSBY. On the leeward side there appears to be quite a channel; I do not know how deep.

Senator MORGAN. Is that the channel which was formed by building the pier and fencing off the water and sand that swept around the coast?

Mr. SORSBY. That is my understanding—it is my impression.

Senator MORGAN. Do the waters of the San Juan River discharge through these different openings into the sea?

Mr. SORSBY. It discharges through one main opening. It discharges through them all, but mainly through one, the San Juan River proper, though most of the water of the lake and San Carlos River are diverted through the Colorado.

Senator MORGAN. But what water comes to Greytown from the San Juan discharges through these openings into the sea?

Mr. SORSBY. Yes, sir.

Senator MORGAN. And I suppose those waters keep the vents open unless they are filled up by washing the volcanic sand from the sea?

Mr. SORSBY. Yes, sir; those harbors are frequently open.

Senator MORGAN. How many navigable lines of water communication are there between Greytown and San Juan River—the interior navigation?

Mr. SORSBY. The principal one used is San Juanillo.

Senator MORGAN. What draft of vessels can run through that in ordinary low water from Greytown to the San Juan River?

Mr. SORSBY. There is a tug there drawing about 7 feet of water. It never has any difficulty in running. I do not know the depth of the water.

Senator MORGAN. Now, what other communication is there between Greytown and the San Juan River by water? I mean interior communication.

Mr. SORSBY. Well, you can go out to sea from Greytown.

Senator MORGAN. I am not talking about going out to sea. I am talking about interior communication between the San Juan River and Greytown—the San Juan River proper or the Colorado River, whichever you choose to call it.

Mr. SORSBY. That is what I was going to say. You go out to sea from Greytown and go up at the end of Colorado River.

Senator MORGAN. I am not speaking of that. What other interior communication is there between Greytown and the Colorado River, I will call it, or the lower reach of the San Juan River, through which navigation is conducted?

Mr. SORSBY. That is the only way, unless you go out to sea.

Senator MORGAN. There is no other way than through the San Juan River?

Mr. SORSBY. No, sir.

Senator MORGAN. There is a lake in there. Is that a part of the San Juanillo River?

Mr. SORSBY. There is a lagoon, the Silico Lagoon, in which they have deep water from Greytown to the farther side of the lagoon, and they are now building a narrow-gauge railway from the lagoon to the junction of the Colorado and San Juan rivers. That is for the purpose—

Senator MORGAN. You say the junction of the San Juan River. You mean to a junction with the San Juan River?

Mr. SORSBY. The San Juan and Colorado rivers.

Senator MORGAN. What is the distance across that divide?

Mr. SORSBY. The railway will be $6\frac{1}{2}$ miles long.

Senator MORGAN. Who is constructing that railroad?

Mr. SORSBY. The Caribbean and Pacific Transit Company, a feeder of the Atlas Steamship Company.

Senator MORGAN. A branch?

Mr. SORSBY. A branch of the Atlas Steamship Company.

Senator MORGAN. That is a company, then, that is operating under the Atlas Steamship Company?

Mr. SORSBY. Yes, sir; and under a charter of the Atlas Steamship Company, that charter or concession having been transferred to the Caribbean and Pacific Transit Company.

Senator MORGAN. Do you know anything of the membership of the Caribbean and Pacific Transit Company? Do you know who they are?

Mr. SORSBY. Yes, sir; I understand that Forward Brothers, of England, are the principal owners.

Senator MORGAN. Of the Atlas Company?

Mr. SORSBY. Of the Atlas Company.

Senator MORGAN. And then the Atlas Company owns the Caribbean and Pacific Transit Company, as I understand?

Mr. SORSBY. Yes, sir; the Caribbean and Pacific Transit Company was formed under the auspices of the Atlas Steamship Company.

Senator MORGAN. What is the business of Forward & Co.?

Mr. SORSBY. They are steamship owners.

Senator MORGAN. Do they seem to be promoting the building of canals and railways?

Mr. SORSBY. Yes, sir; they have endeavored to buy the Government railway of Nicaragua.

Senator MORGAN. Are they engaged in promoting lines of communication by railway and canal through the world?

Mr. SORSBY. The Atlas Steamship Company have their offices in Liverpool and New York. Their main office is in Liverpool, and my understanding is that they control through freights from Central America to Europe.

Senator MORGAN. What I want to get at is the general business of

Forward & Co., whether it is building railways, opening canals, building steamships, or running freight lines and other lines of transportation to any parts of the earth. I understand it is an immense affair.

Mr. SORSBY. The agent, Mr. Wichman, told me when they were negotiating for the purchase of the Nicaraguan Government railway that their purpose was to establish a line of steamers in the Pacific and control the interoceanic freights in that way; that that was a part of their scheme.

Senator MORGAN. What I want to get at is the general business of the company. Do you understand what is the general business of the company?

Mr. SORSBY. I can answer that by referring to the contemplated purchase of the Nicaraguan railway. Their contract provided for the exclusive privilege of constructing railways and establishing transportation facilities and building canals in Nicaragua. That purchase was never consummated, but I understand they have again opened negotiations for the purchase of that railway.

Senator MORGAN. What is the purpose of this little line of railroad between Silico Lagoon and the San Juan River or the Colorado River?

Mr. SORSBY. It is to avoid the shallow water during the dry seasons in the San Juan River between the junction of the San Juan River and Greytown.

Senator MORGAN. I speak of the general purpose. Is it to transport freights and passengers through the San Juan River into the lakes?

Mr. SORSBY. Yes, sir; it is to give them uninterrupted transportation facilities during the dry season for passengers and freight.

Senator MORGAN. What months comprise the dry season in Nicaragua?

Mr. SORSBY. They vary somewhat. July, August, and September, or August, September, and October is about the usual time that the river becomes too low for navigation between the Colorado and San Juan River junction and Greytown. There are two seasons in Nicaragua, one for the west side and another for the east. That of the Pacific coast is more defined than that of the Atlantic.

Senator MORGAN. You have been up and down the San Juan River, I suppose?

Mr. SORSBY. Yes, sir; I have been up——

Senator MORGAN. As far as the lakes?

Mr. SORSBY. I have been up and down twice as far as the lakes, and across Lake Nicaragua once.

Senator MORGAN. Is there any through communication by boats between Lake Nicaragua and the Caribbean Sea for the purposes of freight or passenger transportation?

Mr. SORSBY. No, sir. They transfer at Castillo Rapids, both passengers and freight, to another river steamer, and they transfer from that steamer at San Carlos to the lake steamer for Granada and other points on the lake. Though at high stages of water river boats may pass over the rapids, they do not do so, because the Nicaraguan custom-house is located at the rapids. Recently two of the United States Government steam launches, drawing about 4 feet, have passed over the rapids with safety. The present steamer in the lake, a screw steamer, was taken up to the lake over the rapids.

Senator MORGAN. Is there any other railway or tramway around any of the rapids which is controlled by the Atlas Steamship Company.

Mr. SORSBY. There is only one tramway, and that is at Castillo Rapids. That is controlled by the Atlas Company.

Senator MORGAN. Who owns the boats that run on the river now?

Mr. SORSBY. Nominally the Caribbean and Pacific Transit Company.

Senator MORGAN. You say nominally?

Mr. SORSBY. Yes, sir; because that is a branch of the Atlas Company.

Senator MORGAN. Are there any other boats running on the San Juan River?

Mr. SORSBY. No, sir.

Senator MORGAN. Are the rights of the Atlas Company there exclusive?

Mr. SORSBY. They are, because of their exclusive right to construct tramways and avoid the rapids and obstructions.

Senator MORGAN. Then they have the entire monopoly of the transportation on the San Juan River from the lake to the Caribbean Sea?

Mr. SORSBY. They have.

Senator MORGAN. Is that a right in perpetuity?

Mr. SORSBY. For thirty years.

Senator MORGAN. Do you know what they paid for it?

Mr. SORSBY. There was no consideration expressed.

Senator MORGAN. From whom did they obtain it?

Mr. SORSBY. From the Nicaraguan Government.

Senator MORGAN. Mr. Pellas had a previous exclusive right of navigating that river, I believe?

Mr. SORSBY. Yes, sir.

Senator MORGAN. What became of that right?

Mr. SORSBY. That was sold or merged into the Caribbean and Pacific Transit Company, of which he owns about 33 per cent.

Senator MORGAN. So that the Pellas concession is now merged into the Atlas Company through the Caribbean and Pacific Transit Company, and Pellas still owns 33 per cent of the stock of the latter company?

Mr. SORSBY. Yes, sir. Mr. Wichman, the agent of the Atlas Company, or the Caribbean and Pacific Transit Company, told me that they did not care to use the Pellas concession; that they wanted to operate under their concession obtained in 1897, but the Government has all the while insisted, and now insists, that the company is operating under the old Pellas concession.

Senator MORGAN. How much of the term of the Pellas concession is remaining?

Mr. SORSBY. My impression is about nine or ten years.

Senator MORGAN. So that the Caribbean and Pacific Transit Company is operating under the Pellas concession, and also, as they claim, under the concession from Nicaragua to them?

Mr. SORSBY. Yes, sir.

Senator MORGAN. And the latter concession has thirty years to run from its date?

Mr. SORSBY. Yes, sir.

Senator MORGAN. What was about the date of it?

Mr. SORSBY. It was ratified by the Nicaraguan Congress in September, 1897. I think it was in September.

Senator MORGAN. So it would continue to operate as an exclusive privilege upon that river for thirty years after 1897?

Mr. SORSBY. Yes, sir. The Atlas concession provides that any improvement made in the river or in the harbor will be recognized by the Government in additional privileges.

Senator MORGAN. At what point does the San Juan River take the name of the Colorado?

Mr. SORSBY. It is just below the San Carlos River.

Senator MORGAN. There the San Juan River branches through different exits to the sea, as I understand it, and one of them is called the Colorado?

Mr. SORSBY. Yes, sir.

Senator MORGAN. Another is called the San Juanilla?

Mr. SORSBY. The San Juan.

Senator MORGAN. The San Juan and the San Juanilla?

Mr. SORSBY. Yes, sir.

Senator MORGAN. There are three exits, then, of the San Juan River into the Caribbean Sea?

Mr. SORSBY. Yes, sir; the San Juanilla leaves the San Juan just above the point of diversion of the San Juan and Colorado rivers.

Senator MORGAN. That is the point where these different mouths of the San Juan—

Mr. SORSBY. There are only two rivers there. My idea of the geography of that is a little indistinct. The San Juanilla leaves—

Senator MORGAN. I do not think that is material. I do not care about getting all that geography into your testimony. I just want to get the leading proposition that these three rivers, with their distinctive names, all come from the San Juan River.

Mr. SORSBY. Yes, sir; that is true.

Senator MORGAN. Are the lands in the valley of the San Juan River valuable—I mean for agricultural purposes and timber?

Mr. SORSBY. They are, beginning at about 6 or 7 miles up the river from Greytown.

Senator MORGAN. And extending up to the lake?

Mr. SORSBY. Yes, sir; except immediately on the bank above Castillo.

Senator MORGAN. If a ship canal were constructed through that country would it add to the value of those lands?

Mr. SORSBY. It would add enormously to the value of the lands from about that distance up.

Senator MORGAN. What are the chief agricultural and horticultural productions of that country?

Mr. SORSBY. The chief production at present on the river is cacao, and there is a great deal of rubber brought out from there. There are several rubber plantations planted there. There are several cattle ranches along the river. There are some bananas planted; not much, though it is considered excellent for bananas. There is none grown there now, because of the difficulty of handling them, of shipping over the bar. The woods, the timbers, higher up the river are considered fine and good.

Senator MORGAN. What kind of timber is it?

Mr. SORSBY. I have seen various kind of hard wood.

Senator MORGAN. Mahogany?

Mr. SORSBY. No, sir; I have not seen any mahogany there. Up the river, near the lake, there is quite a lot of cedar, red cedar, and several varieties of cedar. There are various kinds of hard woods in there that I do not know the names of.

Senator MORGAN. Is it a coffee country?

Mr. SORSBY. No, sir. Between the lake and Greytown and near the line of the proposed canal, or near the line of the river, it is not considered a coffee country. The elevation is too low.

Senator MORGAN. Is it a sugar country?

Mr. SORSBY. Yes, sir. I think the soil and climate admirable for the cultivation of sugar cane.

Senator MORGAN. Rice?

Mr. SORSBY. Yes, sir; sugar, rice, fruits, and vegetables of all kinds.

Senator MORGAN. Indian corn?

Mr. SORSBY. I doubt that Indian corn would grow very well in any part of the country.

Senator MORGAN. Is it a good cattle country?

Mr. SORSBY. Yes, sir; a good cattle country.

Senator MORGAN. Does it appear to be a well-watered country?

Mr. SORSBY. Yes, sir.

Senator MORGAN. How about the health of that region between the lake and the seaboard?

Mr. SORSBY. I can only answer that by referring to the men employed by the Nicaragua Canal Commission.

Senator MORGAN. Have no people settled in that region?

Mr. SORSBY. There are some settlements immediately on the river banks and up the various rivers emptying into the San Juan River.

Senator MORGAN. Leading into, you mean?

Mr. SORSBY. Leading into the San Juan River. I have seen a great many of those people—some foreigners are in there—living on the San Carlos and various other rivers leading into the San Juan River, and the universal expression is that it is healthy.

Senator MORGAN. Is there any yellow fever or chagres fever in that country?

Mr. SORSBY. There is no yellow fever in any part of Nicaragua.

Senator MORGAN. Is there any chagres fever?

Mr. SORSBY. No, sir; nothing that resembles either yellow or chagres fever on the Atlantic side. There is no yellow fever in any part of Nicaragua, though at Granada and Managua they have malarial fevers. They are quite prevalent during what is known as the dry season up there.

Senator MORGAN. That is on the lake?

Mr. SORSBY. Yes, sir; on the two lakes. It is attributed to the bad sanitary conditions and the water that is used.

Senator MORGAN. If I understand you correctly, the valley of the San Juan River is very sparsely inhabited?

Mr. SORSBY. Yes, sir.

Senator MORGAN. Is the forest heavy?

Mr. SORSBY. The undergrowth is very heavy.

Senator MORGAN. Almost impenetrable?

Mr. SORSBY. Yes, sir.

Senator MORGAN. What is the effect of the rainfall in that part of Nicaragua upon the health and comfort of those living in that region?

Mr. SORSBY. I think it is beneficial to health. It is inconvenient. It has the effect of keeping fresh water in all the lagoons there. The engineers of the canal commission tell me that they drank their water out of the lagoons and streams and it was good. In Greytown it serves to freshen the atmosphere, and there is very little sickness during the rainy season.

Senator MORGAN. I gather from your statement, then, that the rainfall there would neither be deleterious to the health of the country nor to the construction or preservation of such a work as a canal with embankments?

Mr. SORSBY. It certainly would not affect the preservation, judging from the indication shown by the work that has been done there. It might be inconvenient. Constant rainfall would naturally be inconvenient to a day laborer. It is considered there that that is the healthiest part of the year in Greytown and vicinity.

Senator MORGAN. Do the trade winds blow through the gap or gorge in the Cordilleras through which the San Juan River runs?

Mr. SORSBY. Yes, sir; the winds are stronger in what might be termed the spring and fall of the year than at any other time.

Senator MORGAN. Is there any period of the year when there are no winds blowing through there steadily?

Mr. SORSBY. No, sir. There is usually very strong wind or a considerable breeze at all times, with the exception of from 5 to 9 or 10 o'clock in the evening. Sometimes it dies out and becomes very hot in Greytown. In the squalls that occur in the earlier and later part of the year the captains of the steamers have told me that the wind blew as high as 40 miles an hour.

Senator MORGAN. The point I was trying to get at is as to the steadiness of the winds through those gaps.

Mr. SORSBY. They are constant, with the exception that I explained. Sometimes they die out in the evening. The nights and mornings are always fresh and pleasant there. Sailing vessels have no difficulty on account of the winds. That is the principal means of communication between Bluefields and Port Limon and Greytown.

Senator MORGAN. Have you experienced any inconvenience from earthquakes since you have been there?

Mr. SORSBY. There has been none felt at Greytown or in the valley since I have been there. I am told that there are never any felt there. However severe they may be on the Pacific side, if felt at all on the Atlantic side it is in a very slight degree, especially in Greytown.

Senator MORGAN. I want to ask you about the characteristics of the population in Nicaragua generally. Please state what you know as to the different races there, their habits and their qualities as agricultural or other laborers.

Mr. SORSBY. In the San Juan Valley and in Greytown there is a race known as Caribs. They are negroes and belong to that section of country. They are the principal laboring people on the coast. In Greytown there are quite a number of Jamaican negroes. The rest of the laborers are natives of the country, a mixture of Indian. The Caribs are considered good laborers, and also the natives of the country. I have seen squads of native laborers that work on the railway being constructed from Silico Lagoon to the Colorado junction, and they gave satisfaction to the railroad company. All the labor of the interior of the country is performed by the Indian class of people. On the coffee estates, cattle ranches, cacao estates, and sugar estates—in fact, all the labor of the interior is performed by the native Indian class.

Senator MORGAN. Have they a peonage system in Nicaragua?

Mr. SORSBY. Yes, sir; that prevails in the interior.

Senator MORGAN. What are the characteristics of that system?

Mr. SORSBY. Well, when the employee becomes a debtor he is matriculated and must work out that debt, and he can be transferred to any other employer by the sale of this debt.

Senator MORGAN. When revolutions or political outbreaks occur there leading to violence, what course is pursued by the military men toward this laboring population as to putting them under arms as soldiers?

Mr. SORSBY. They are forcibly conscripted.

Senator MORGAN. Describe, as well as you know, the manner in which that is done.

Mr. SORSBY. They send out recruiting officers and take them by force and put them in the army. Both sides do that, the revolutionists and the Government people. They are forced to serve on whichever side they are caught, and they are all subject to that except where immunity is bought by the owner of an estate employing labor. It is not unusual for a planter to pay a sum of money to have his labor left alone.

STATEMENT
OF
M.R. A. G. MENOCAL
BEFORE THE
COMMITTEE ON INTEROCEANIC
CANALS,
UNITED STATES SENATE.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Tuesday, February 5, 1902.*

The committee met at 10.30 a. m.

Present: Senators Morgan (chairman), Hanna, Mitchell, Kittredge, Hawley, and Harris.

Mr. A. G. Menocal appeared and was duly sworn by the chairman.

STATEMENT BY MR. A. G. MENOCAL.

The CHAIRMAN. Mr. Menocal, in what school of engineering were you educated?

Mr. MENOCAL. In the Troy Polytechnic.

The CHAIRMAN. New York?

Mr. MENOCAL. State of New York.

The CHAIRMAN. You are a Cuban by birth?

Mr. MENOCAL. Yes.

The CHAIRMAN. A citizen of the United States?

Mr. MENOCAL. Yes.

The CHAIRMAN. When were you first appointed a civil engineer in the Navy?

Mr. MENOCAL. In 1874.

The CHAIRMAN. Who was in office then as President?

Mr. MENOCAL. President Grant.

The CHAIRMAN. When was the first visit that you made to Nicaragua, and in what capacity?

Mr. MENOCAL. In 1872, as chief engineer of the expedition sent by the United States to ascertain the practicability of a canal across that country.

The CHAIRMAN. Who sent you then?

Mr. MENOCAL. The Navy Department appointed me.

The CHAIRMAN. That was two years before you were appointed a civil engineer in the Navy?

Mr. MENOCAL. Yes.

The CHAIRMAN. Where were you when you received this appointment?

Mr. MENOCAL. I was employed as engineer in the department of public works in New York City.

The CHAIRMAN. Besides this canal work which you have been doing, I would like you to mention some other public works in which you have been engaged for the Government of the United States, or for other parties.

Mr. MENOCAL. I was sub chief engineer of the Habana waterworks from 1863 to 1869. I was engineer in the department of public works in New York from 1869 to 1872, when I was first employed in con-

nection with the Nicaragua Canal project. Then in the Navy I have been engaged in various works connected with the Navy Department, at the navy-yards, such as building dry docks, and quay walls, and wharves, docks, and buildings of various kinds, dredging, laying railroad tracks, building waterworks, drains, and numerous other works connected with the various navy-yards. I was for eight years the consulting engineer of the Bureau of Yards and Docks in the Navy Department, that Bureau having charge of all public works in the various navy-yards and stations.

The CHAIRMAN. Did you have any connection with the gun factory in Washington?

Mr. MENOCAL. Yes; I was the engineer in charge of the designing and building of the foundry and machine shops.

The CHAIRMAN. That is the gun factory here?

Mr. MENOCAL. Yes.

The CHAIRMAN. Have you done any work in the Philippines?

Mr. MENOCAL. I have been a member of the commission that was ordered by the Department to select the best site in the Philippines for a naval station, and I am now a member of a board appointed by the Department to prepare plans for the development of this naval station, and also for the development of the new naval station at Charleston, S. C.

The CHAIRMAN. Have you done any work for the Government of Nicaragua?

Mr. MENOCAL. Yes; I have made special surveys of the San Juan River and the harbor of Greytown, with a view of improving the navigation of the river and restoring the harbor.

The CHAIRMAN. How did you happen to be employed on that work?

Mr. MENOCAL. By the request of the Nicaraguan Government, and the Government of the United States.

The CHAIRMAN. Did the Government of the United States assign you to that duty?

Mr. MENOCAL. It did not assign me, but gave me permission to assent to the request of the Government of Nicaragua for my employment in this capacity.

The CHAIRMAN. When was that?

Mr. MENOCAL. In 1876 and 1877.

The CHAIRMAN. Did you make those surveys?

Mr. MENOCAL. Yes.

The CHAIRMAN. The San Juan River and the harbor of Greytown?

Mr. MENOCAL. Yes.

The CHAIRMAN. Did you report them to the Government of Nicaragua?

Mr. MENOCAL. Yes.

The CHAIRMAN. Have they ever been reported to this Government?

Mr. MENOCAL. No; it was independent of any connection with this Government.

The CHAIRMAN. How long were you engaged in making those surveys of the rivers?

Mr. MENOCAL. I was engaged for two sections of about six months each, in 1876 and 1877.

The CHAIRMAN. I suppose the Government of Nicaragua intended to proceed to make improvements there?

Mr. MENOCAL. The Government of Nicaragua had intended to

improve the navigation and the rapids of the river San Juan, and also to do certain work so as to improve the condition of the harbor of Greytown, in order to obtain a sufficient depth of water for ships of small draft to come into the harbor.

The CHAIRMAN. Why was the work not prosecuted after your surveys were made?

Mr. MENOCAL. The work was started, but while I was working on the rapids of the river San Juan the Government of Nicaragua had certain difficulties with the German Government in regard to claims of the German consul in Nicaragua, and the money that they had laid aside for those works had to be paid to the German Government in compliance with the demands made on the Government of Nicaragua on account of those claims, and the work was consequently suspended, and never resumed afterwards.

The CHAIRMAN. In making that survey for the Government of Nicaragua did you or the Government have it in contemplation to open the entrance to the bay or harbor at Greytown?

Mr. MENOCAL. Yes.

The CHAIRMAN. You made surveys with reference to that?

Mr. MENOCAL. I made a survey of the harbor with reference to that.

The CHAIRMAN. What was the depth of the water at that time, at the entrance?

Mr. MENOCAL. It was not more than 6 feet.

The CHAIRMAN. What was the depth in the bay?

Mr. MENOCAL. From 20 to 25 feet, and in places as much as 30 feet.

The CHAIRMAN. About what is the acreage of that bay? I will get it in acres, so that you can give us a more accurate idea of what it was as it was originally.

Mr. MENOCAL. I do not remember.

The CHAIRMAN. Could you approximate it?

Mr. MENOCAL. It is a large body of water. It would be difficult for me to do so.

The CHAIRMAN. Could you approximate it?

Mr. MENOCAL. From memory it would be such a rough approximation that I do not think it would have any value. It is a very large body of water, about 3 miles long by perhaps $1\frac{1}{2}$ or 2 miles wide.

The CHAIRMAN. We can get it in that way then.

Mr. MENOCAL. Yes.

The CHAIRMAN. Have you been at Havre, France?

Mr. MENOCAL. Yes.

The CHAIRMAN. How would it compare with the bay at Havre in size?

Mr. MENOCAL. Greytown?

The CHAIRMAN. Yes.

Mr. MENOCAL. This is very much larger in size.

The CHAIRMAN. Greytown is much larger?

Mr. MENOCAL. Yes, what we call the Greytown Lagoon, which used to be the harbor of Greytown before the entrance was closed by the drifting of the sand.

The CHAIRMAN. I suppose in your travels over the world and your examination of things you have visited harbors that have been entirely made by being dug out artificially?

Mr. MENOCAL. By digging out and building artificial works, such as breakwaters, yes.

The CHAIRMAN. Name some of them.

Mr. MENOCAL. Holyhead, England.

The CHAIRMAN. About what is the size of that bay or harbor?

Mr. MENOCAL. It would be very difficult for me to say.

The CHAIRMAN. Is it as large as Greytown?

Mr. MENOCAL. Yes, it is.

The CHAIRMAN. Name another.

Mr. MENOCAL. Sutherland, on the east coast of England; Dover and Calais.

The CHAIRMAN. Are they artificial?

Mr. MENOCAL. All those are artificial harbors.

The CHAIRMAN. Do you remember any others that you examined personally?

Mr. MENOCAL. Not at this moment.

The CHAIRMAN. Are all of them ports of importance?

Mr. MENOCAL. Yes; very great commercial ports.

The CHAIRMAN. They have been entirely constructed by artificial means?

Mr. MENOCAL. Yes.

The CHAIRMAN. Have you ever been at Port Said?

Mr. MENOCAL. I have not.

The CHAIRMAN. Have you examined the plans of Port Said?

Mr. MENOCAL. I am familiar with the plans.

The CHAIRMAN. Was that constructed artificially?

Mr. MENOCAL. That was also constructed by the building of two jetties projecting into the sea; that is to say, by artificial means.

The CHAIRMAN. As a rule are those harbors better than those made by engineers in proper localities? Are they safer and easier of access than natural harbors?

Mr. MENOCAL. Very frequently they are, because the engineers place the entrance so as best to protect the entrance and egress of ships to and from the harbor, and also so as to give the best protection in regard to the prevailing winds and heavy seas.

The CHAIRMAN. They are located with reference to those facts?

Mr. MENOCAL. Yes; so as to ameliorate the conditions that may exist. And then as a rule artificial harbors are built in places where there is no river coming into the harbor, while natural harbors, as a rule, have rivers coming into them, and rivers very frequently are charged with sediment and produce a silting up of the harbors and require constant dredging.

Senator HANNA. Greytown is that kind of a harbor, is it not?

Mr. MENOCAL. Greytown has been that way; yes.

Senator HANNA. Well, it is now, is it not?

Mr. MENOCAL. It is filled up. There is no harbor there now. The entrance is closed.

Senator HARRIS. The flow of the San Juan River is now practically diverted from the harbor, is it not?

Mr. MENOCAL. Yes. At times it comes through the harbor and breaks through the sand banks and flows through the channel for a little while, but then the wind or the action of the waves drift the sand and close the entrance, and the harbor again becomes a lagoon.

Senator HARRIS. A properly constructed artificial harbor there would not be subject to the influences of the action of the river?

Mr. MENOCAL. No, sir; that was proved by the work that I did

there for the Maritime Canal Company. The company started to build a breakwater to protect the entrance to the harbor from this drifting sand, and in a short time, when we had only built a very small section of the proposed breakwater, and built it imperfectly, because the company did not have large means at hand, we were able to obtain 15 feet of water under the lee of this breakwater; and I am sure if we had been able to extend the breakwater as we intended the entrance could have been dredged out to any depth required, and would have been remaining there to-day; but the works were suspended for the want of funds and the drifting sand filled the angle made between the breakwater and the beach, and the sand drifted around the head of the breakwater and the harbor was closed again.

Senator HARRIS. That is, the action of the current outside carried it around the breakwater?

Mr. MENOCAL. Yes; the drift of the sand along the coast by the action of the sea, which strikes the beach at an angle of about 45 degrees, and there is a shifting of the sand all the time from east to west.

Senator HARRIS. The conditions that prevailed there prior to 1856 were such that the bar protected the harbor from being filled up by the sand?

Mr. MENOCAL. Precisely. This sand bank was advancing from the eastward. It was making the harbor safer and safer; but when the westerly slope of this sand bank that was approaching from the eastward struck the slope of the west side of the harbor, then the entrance commenced to close very rapidly, and in a very short time the harbor was entirely closed.

Senator HARRIS. A restoration of the natural conditions existing at that time would lead to the same condition?

Mr. MENOCAL. Yes; there is no doubt that a safe harbor could be built there at a very small expense.

The CHAIRMAN. Did you ever visit Nicaragua in the capacity of an engineer or prospector before you went as a member of the exploring or engineering party?

Mr. MENOCAL. No, sir.

The CHAIRMAN. Now, I will get you to state chronologically, if you please, what connections you have had with the explorations and surveys in Nicaragua and in Panama, just as they have occurred. Just give your connection with them, and state in what capacity you served, and the length of time you have devoted to these questions.

Mr. MENOCAL. It would be quite a long statement, and at your suggestion I have prepared a written statement to cover the subject pretty well. It is rather long.

The CHAIRMAN. Well, we want to get the facts.

Mr. MENOCAL. Of course my connections were very long, extending over about thirty years, and I have been in both places many times.

The CHAIRMAN. This statement is made by yourself?

Mr. MENOCAL. Made by myself.

The CHAIRMAN. It is all true?

Mr. MENOCAL. Yes.

The CHAIRMAN. I will read it so we can get it in our minds as a basis of action.

Senator HANNA. You will get it printed, will you not?

The CHAIRMAN. Yes, but I want to read it to the committee.

**"STATEMENT OF MY CONNECTIONS WITH THE ISTHMIAN CANAL PROJECT
SINCE 1872.**

"I had no part in Colonel Child's surveys, which were made in 1852.

"My first connection with the enterprise was in March, 1872, when, on the recommendation of Gen. George B. McClellan, I was appointed by the Navy Department chief engineer of the expedition sent out by the Government to survey the Nicaragua route. The surveys were completed in 1873, and the report submitted by Commander E. P. Lull, United States Navy, the commanding officer of the expedition.

"In 1874 I was ordered by the Navy Department to accompany the Isthmian Canal Commission, appointed by President Grant, over the Nicaragua route as located by the Lull's surveys. In 1875-76, I was chief engineer of the Panama surveying expedition commanded by Commander E. P. Lull, United States Navy. The reports of Commander Lull refer to the services rendered by me in connection with surveys under his charge. In 1876 the Nicaraguan Government, through its minister in Washington, requested the Navy Department to grant me leave of absence to enable me to make certain surveys and devise plans for improving the navigation of the river San Juan, connecting the lakes by a canal, and for the restoration of the harbor of Greytown. The surveys and plans were approved by that Government, and the work of improving the river navigation through the rapids was actually commenced, but was soon after discontinued because the funds set aside for that purpose had to be applied to the payment of an urgent claim of the German consul, backed by a war ship at Corinto. The works were not resumed afterwards, as the Government of Nicaragua expected an early beginning of the canal works.

"In April, 1879, I was appointed by the President a commissioner to the Paris Canal Congress. I laid before the congress the results of the surveys made by our Government at both Nicaragua and Panama. I opposed the building of a sea-level canal at Panama as an impracticable scheme, and, while I admitted the practicability of a lock canal at Panama, I contended that the Nicaragua route presented greater advantages as an engineering proposition and would be less costly. President Grévy, of France, decorated me on the occasion with the cross of the Legion of Honor, in recognition of my services, both on the isthmus and in the congress, in promoting the canal problem.

"In 1880, the 'Provisional Inter-Oceanic Canal Society' was organized, the following gentlemen being signers of the articles of agreement: Gen. E. F. Beal, Daniel Ammen, George F. Baker, U. S. Grant, jr., D. O. Mills, Frederick Butterfield, Frederick Billings, William R. Garrison, William H. Barnum, Geo. B. Loring, Levi P. Morton, George W. Riggs, William H. Crapo, H. J. Jewett, William Denison, A. G. Menocal, Howard Potter, John H. Ketchum, H. M. Hutchinson, B. H. Bristow, S. L. Phelps, and others. In March, 1880, I was directed by the Secretary of the Navy to proceed to Nicaragua for the purpose of making certain examinations of the proposed ship-canal route. I was also requested by the Provisional Society, herein referred to, to act as its agent in Nicaragua in negotiating for a canal concession.

"I conducted the examinations as directed by the Navy Department, introducing important improvements on the canal route as located by

the Lulls surveys, and obtaining valuable information of the topography in the valley of the river San Juan, which proved of great value in locating the high level route in 1885.

“I also obtained from the Nicaraguan Government the canal concession desired by the Provisional Inter-Oceanic Canal Society. Congress was convened in extra session, and ratified the same. The opposition of the Panama Canal Company against the Nicaragua route was then too powerful; the association was unable to raise the necessary funds for the works, and the concession lapsed by limitation in 1884.

“Upon the completion of the Zavala-Frelinghuysen treaty of December, 1884, I was directed to proceed to Nicaragua with a party of assistants and conduct such surveys as in my opinion would improve previous locations of the canal route.”

The CHAIRMAN. You say you were directed. By whom were you directed?

Mr. MENOCAL. By the sub-Secretary of State.

The CHAIRMAN. Who was he?

Mr. MENOCAL. Mr. Davis, who was then sub-Secretary of State under Mr. Frelinghuysen. He is now a judge of the Court of Claims.

The CHAIRMAN. [Reading:] “I was also expected to use my best efforts in having the canal treaty ratified by the Congress of that Republic.

“The treaty was promptly ratified.”

You say the treaty was promptly ratified. You mean by Nicaragua?

Mr. MENOCAL. By Nicaragua.

The CHAIRMAN [reading]. “The result of my surveys was a complete change in the location and plans for the canal, as shown by my report to the Navy Department, 1884–85.

“Upon the publication of this report the canal question was taken up again by influential business men, and the Nicaragua Canal Association was organized.

“In March, 1887, I was requested by this association to act as its agent for the purpose of obtaining a canal concession from Nicaragua. Leave of absence was then granted me by the Secretary of the Navy, W. C. Whitney, to enable me to carry out this mission, on which occasion you interested yourself with the President and Secretary of the Navy to accomplish that result.”

When you say, “You interested yourself,” you speak of me now?

Mr. MENOCAL. Yes.

The CHAIRMAN (reading:)

“The concession desired was obtained and ratified by both Houses of Congress in April, 1887.

“A similar concession was obtained by me for the association in August, 1888, from Costa Rica.

“In obtaining the concession, the association appointed me its chief engineer. The final surveys were commenced in November, 1887, and carried on with a large force of engineers and assistants until completed in detail and the plans approved by the Government of Nicaragua, as required by the concession. Leave of absence was granted me by Secretary Whitney in 1888 to enable me to supervise this work.

“In 1889 the preliminary location and plans having been completed, and the construction company incorporated and organized, I was appointed chief engineer of the company. My presence was there needed in Nicaragua to conduct the work of construction under my

immediate direction and supervision. I requested the Navy Department to grant me another leave of absence for that purpose. To my application for leave, the Secretary wrote the following indorsement:

“MARCH 1, 1889.

“The leave is asked for to enable Mr. Menocal to act as chief engineer of the Nicaragua Canal. His services are really necessary to the undertaking, such has been his prominence in connection with it in the past. Otherwise, I would not grant the request; but in view of the public importance of the enterprise to our country it is entirely fit to give any assistance in our power.

(Signed)

“W. C. WHITNEY.”

“From that date until work on the canal was suspended in 1892, on account of financial difficulties, my whole time was devoted to the undertaking, both at Nicaragua and in the office at New York, as my services were required.

“Since June, 1892, when I returned to my duties in the naval service, I have continued to act as consulting engineer of the Construction Company and of the Maritime Canal Company of Nicaragua, but without accepting any compensation for my services.”

Senator HANNA. Is that company still in existence?

Mr. MENOCAL. It is supposed to be, sir.

The CHAIRMAN. Oh, yes; it is in existence in the United States; never has been dissolved, but it is not recognized by Nicaragua.

Now, Mr. Menocal, during this period of years, about how much time did you spend personally in Nicaragua?

Mr. MENOCAL. From 1872 to 1893, I suppose I personally spent eight years in Nicaragua.

The CHAIRMAN. Are you very familiar with the topography, geography, and hydrography of Nicaragua?

Mr. MENOCAL. I believe I am.

The CHAIRMAN. Personally?

Mr. MENOCAL. I believe I am, sir.

The CHAIRMAN. Have you been over all of these lines yourself?

Mr. MENOCAL. I have.

Senator HARRIS. Permit me, Mr. Chairman, to ask what his familiarity is with the Isthmus of Darien, between Panama and Colon.

Mr. MENOCAL. Between Panama and Colon; I located a line for a canal there in 1875-76 as chief engineer of the expedition sent by the Government.

Senator HARRIS. Near the line occupied by the railroad?

Mr. MENOCAL. Very near.

Senator HARRIS. And consequently near the line adopted by the French company. All the surveys were along practically the same line as that followed by the French company afterwards.

Mr. MENOCAL. All the surveys have been practically along the same lines there.

The CHAIRMAN. Before you made your survey at Panama, had there been any canal survey made there?

Mr. MENOCAL. No, sir.

The CHAIRMAN. Only the railroad survey?

Mr. MENOCAL. Only the railroad survey.

The CHAIRMAN. Who made that railroad survey?

Mr. MENOCAL. Mr. Totten, I think.

Senator MITCHELL. In what year did you say you made your survey?

Mr. MENOCAL. In the winter of 1875-76.

The CHAIRMAN. Who was the commander in chief of that expedition?

Mr. MENOCAL. Commander E. P. Lull, United States Navy.

The CHAIRMAN. Who was the chief engineer of the expedition?

Mr. MENOCAL. I was the chief engineer.

The CHAIRMAN. About what was the size of your party, taking it all together.

Mr. MENOCAL. We had three engineering parties, and each one was composed of about twenty-four persons, engineers and assistants.

The CHAIRMAN. Was that survey carefully made?

Mr. MENOCAL. It was a preliminary location, and as such it was very carefully made. It was accurate so far as it went.

Senator HANNA. You speak now of the Panama survey?

Mr. MENOCAL. Yes.

The CHAIRMAN. Where did you start in?

Mr. MENOCAL. Well, we started at both ends, you might say. We had parties on both ends from the start and also between the two ends along the river Chagres and in the vicinity of the Panama Railroad and the river.

Senator MITCHELL. What proportion of the railroad would have been taken if the canal had been constructed where your preliminary survey was made?

Mr. MENOCAL. The line of the canal would have crossed the railroad at one point only, and there it was proposed to have a bridge across the canal. The location of the Panama Railroad as it is now would not have been changed materially.

The CHAIRMAN. Now, I will ask you what were the dimensions of the canal you located there?

Mr. MENOCAL. It was quite small. The widest portion of the canal excavation was about 72 feet at the bottom and in some places it was as narrow as 60 feet.

The CHAIRMAN. How deep?

Mr. MENOCAL. The depth was 24 feet.

The CHAIRMAN. How many locks did you intend to put into the canal?

Mr. MENOCAL. If I remember correctly 22 locks, 11 on each side. It has been some time since I have looked at the plans, but I think that is the correct number.

The CHAIRMAN. Describe, if you please, the line that you ran from Colon to the Bay of Panama, stating where it ran, which side of the Chagres River, and the different contrivances that you proposed in that survey for completing a lock canal.

Mr. MENOCAL. Our line started from the Bay of Colon and ran in the general direction toward Matachin, which is a point on the River Chagres just below Obispo.

The CHAIRMAN. How far from the Caribbean coast.

Mr. MENOCAL. Thirty miles.

The CHAIRMAN. Go ahead.

Mr. MENOCAL. At this point the canal was to be about 124 feet above sea level, and the River Chagres was then to be crossed by a viaduct.

The CHAIRMAN. How long was that viaduct?

Mr. MENOCAL. Over a thousand feet long. I do not remember exactly the length proposed for it. Then it followed the valley of the Obispo River or brook to the present Culebra cut, passing by Empeador, and after crossing the Culebra hills it followed exactly the same line that is now being proposed by the Panama Canal Company, passing by Pedro Miguel and Miraflores and from there to Laboca.

The CHAIRMAN. So that until you got to the viaduct—which is how far from the Caribbean coast——

Mr. MENOCAL. Thirty miles.

The CHAIRMAN. Until you got to the viaduct the Chagres River was entirely to the westward of your survey, as I understand you?

Mr. MENOCAL. Yes.

The CHAIRMAN. You passed up the right bank of the Chagres River?

Mr. MENOCAL. Yes.

The CHAIRMAN. And then crossed with a viaduct a thousand feet long?

Mr. MENOCAL. About a thousand feet long, more or less.

The CHAIRMAN. Did you again cross the Chagres?

Mr. MENOCAL. No, sir; we crossed it only once, and that was at that point.

The CHAIRMAN. How did you expect to provide for the water supply for that canal?

Mr. MENOCAL. We proposed to have a dam in the upper valley of the Chagres, just in about the same location as the proposed Alhajuela dam now suggested by the French engineers, and had intended to create a reservoir there and then build a conduit from this reservoir to the summit level of the canal near Obispo, where quite a large basin was to be created for the distribution of the water.

The CHAIRMAN. So that the water supply, as I understand you, was to be obtained from the upper Chagres?

Mr. MENOCAL. About at Alhajuela.

The CHAIRMAN. And conveyed in a conduit into a basin?

Mr. MENOCAL. Yes.

The CHAIRMAN. And there distributed into a canal?

Mr. MENOCAL. Yes.

The CHAIRMAN. At what height above the ocean?

Mr. MENOCAL. One hundred and twenty-four feet.

Senator HANNA. Is that the height of the present proposed construction?

Mr. MENOCAL. No, sir; several elevations have been proposed lately. I think the one recommended by the Commission for the summit level is 85 feet.

Senator HARRIS. Eighty-five feet, with a maximum of 90 feet?

Mr. MENOCAL. With a maximum fall of 92 feet in high floods.

Senator HARRIS. Have you examined the proposition of the Isthmian Canal Commission with regard to the dam at Bohio?

Mr. MENOCAL. I have.

Senator HARRIS. Which involves the sinking of a foundation 128 feet below sea level?

Mr. MENOCAL. Yes, sir.

Senator HARRIS. What is your opinion of that?

Mr. MENOCAL. I think it is a work involving enormous difficulties as an engineering proposition.

Senator HARRIS. Have you seen the paper that has recently been written by Mr. Morison, of the Commission?

Mr. MENOCAL. I have.

Senator HARRIS. On that subject?

Mr. MENOCAL. I have.

Senator HARRIS. In which he says that no engineer would pretend to indicate how the work was to be done at present?

Mr. MENOCAL. I have read it, sir.

Senator HARRIS. Do you agree with him as to the difficulties with regard to the pneumatic construction?

Mr. MENOCAL. I do, sir.

The CHAIRMAN. I wish you would point out the particular to which he refers. I have that paper here. What is the book from which you read?

Mr. MENOCAL. This is the proceedings of the American Society of Civil Engineers.

The CHAIRMAN. When was that printed?

Mr. MENOCAL. In January, 1902.

The CHAIRMAN. And what is the paper to which you refer?

Mr. MENOCAL. This is a paper by Mr. Morison, a member of the society, and a member of the Isthmian Canal Commission. It is a paper on the Bohio Dam, which he describes as a very difficult engineering work, involving special designs and unprecedented use of the pneumatic process proposed by the Commission for sinking the foundations of the dam.

Senator HARRIS. From what he says there you would suppose it was entirely beyond the limits of any engineering experience in that direction.

Mr. MENOCAL. I should think so.

Senator HANNA. That is, you think it can not be done?

Mr. MENOCAL. That is my opinion, that it can not. At least the work is very doubtful of successful execution.

Senator HANNA. You have some doubts about it?

Mr. MENOCAL. Very serious doubts.

Senator HANNA. Doubts as to whether it can or can not be done?

Mr. MENOCAL. Well, I would not propose it—I would not undertake it.

Senator MITCHELL. Could we have that paper copied?

The CHAIRMAN. It is here, and Mr. Menocal or any member of the committee can use it.

Senator HARRIS. I was not proposing to incorporate that paper in full.

The CHAIRMAN. Perhaps Senator Harris had better point out the points to which he refers in his question. I do not know what they are.

Senator HARRIS. There are one or two points about which I wanted to ask. He mentions in several places here the presence of a permeable body of material at a great depth.

Mr. MENOCAL. Yes.

Senator HARRIS. And also that its connection with the water of the Chagres River is clearly indicated; as he says here, the evidence of this being that when a pipe is driven into this material the water in the pipe stands at the same level as that in the river.

Mr. MENOCAL. Yes.

Senator HARRIS. That would indicate that at some point above there is a direct connection with this permeable mass?

Mr. MENOCAL. My impression is that the whole valley is permeable more or less—the bottom of the Chagres, the flood valley.

Senator HARRIS. You do not think it is covered by a sufficiently heavy and tight blanket; I believe that is the technical expression?

Mr. MENOCAL. That is the proper expression. I do not believe that it is sufficiently covered in that way. The description of the valley by the Commission shows that it is composed of gravel, sand, clay, and other permeable materials mixed in various proportions.

Senator HARRIS. The Commission's report also indicates that they recognize the existence of this permeable material?

Mr. MENOCAL. Yes; but even this top blanket, I think, is permeable as well, in the greater part of it, if not at all points.

Senator HARRIS. The fact that they sunk or bored down at points 50 feet apart would not indicate that there were not serious fissures to be encountered between those points?

Mr. MENOCAL. Precisely; there may be deeper holes there, and the rock may be full of fissures, and what is supposed to be rock may be nothing but boulders embedded in soft, permeable material.

Senator HARRIS. The French engineers had met similar conditions at a point higher up the river?

Mr. MENOCAL. Yes.

Senator HARRIS. And they had supposed there that they had a solid foundation, which our Commission, by their exploration, demonstrated to be unfounded?

Mr. MENOCAL. Yes.

Senator HANNA. Right there, you say that the rocks encountered might be boulders?

Mr. MENOCAL. Might prove to be boulders.

Senator HANNA. Is it likely that boulders would occur at just those distances, 50 feet apart?

Mr. MENOCAL. Well, that might be. There may be a bed of boulders there.

Senator HANNA. It may be boulders and it may be some other rock.

Mr. MENOCAL. Precisely; I say it may be. I do not say that it is.

Senator HARRIS. Simply a possibility?

Mr. MENOCAL. Yes.

Senator HANNA. Are there any geological indications to show deposits of boulders in that valley?

Mr. MENOCAL. I could not say.

Senator HARRIS. Does not Mr. Morison's paper, as to the geological formation of the valley which he describes, which is the one under consideration, indicate, and does not the report of the Commission indicate, that the strong probabilities are that the whole mass of material is of the character of boulders and drift?

Mr. MENOCAL. I think so.

Senator HARRIS. Is not that clearly shown?

Mr. MENOCAL. I think so.

Senator HANNA. That is at the depth of 125 feet?

Mr. MENOCAL. One hundred and twenty-eight feet.

Senator HARRIS. Nobody knows how far it may go.

Senator HANNA. Do you find that in the report of the Commission?

Mr. MENOCAL. A depth of 128 feet for work of this kind is unprecedented.

Senator HANNA. In reading the report of the Commission several times I did not remember their saying that there were boulders there.

The CHAIRMAN. That 128 feet is computed from sea level?

Mr. MENOCAL. Yes.

The CHAIRMAN. One hundred and twenty-eight feet below sea level?

Mr. MENOCAL. Yes.

The CHAIRMAN. How much is the sea level below the surface of the river at that point?

Mr. MENOCAL. Eight or 10 feet; that is, below the lowest stage of the river.

The CHAIRMAN. At the normal stage?

Mr. MENOCAL. The normal low stage. In the rainy season the normal is higher. I am speaking about the lowest level of the water there. It is about 8 or 10 feet above sea level. That would have to be added to the 128 feet.

The CHAIRMAN. Is that the year round, that normal stage? Would that 10 feet be the average through the year?

Mr. MENOCAL. In the dry season.

The CHAIRMAN. But I want the average for the entire year.

Mr. MENOCAL. The average for the year would be higher than that.

The CHAIRMAN. About how much higher?

Mr. MENOCAL. Maybe about 4 or 5 feet higher.

The CHAIRMAN. That would be about 15 feet?

Mr. MENOCAL. About 15 feet.

The CHAIRMAN. So you would add from 10 to 15 feet to the estimate of 128 feet below sea level?

Mr. MENOCAL. I would not be inclined to do that, for the reason that the engineer in charge of the work must build a temporary dam diverting the River Chagres from its present course, during the construction of this work. Otherwise the floods of the Chagres River would destroy it.

Senator HARRIS. The Commission, according to what Mr. Morison says, has neglected to provide any estimate for the temporary dam.

Mr. MENOCAL. No provision has been made for it.

Senator HARRIS. It is not proposed by the Commission?

Mr. MENOCAL. No provision has been made for it in the estimates.

Senator HARRIS. Mr. Morison thinks that a temporary dam costing some \$2,000,000 would have to be constructed first, I believe.

Mr. MENOCAL. Yes.

Senator HARRIS. He gives a table here.

Senator HANNA. What page is that on?

Senator HARRIS. This is in Mr. Morison's book. He says "Commission's plan, \$5,869,640; both dams (meaning the permanent and the temporary dam), \$6,755,095."

Mr. MENOCAL. There is an error in that estimate. You see that the unit prices for pneumatic work used by Mr. Morison are not the same as those adopted by the Commission for the Bohio dam. He estimates \$21.50 per cubic yard on caisson work, and the Commission estimates \$29.50. So, when you make this correction, the cost of the dams as given there would be increased by about a million dollars.

Senator HARRIS. If you use the Commission's unit of prices?

Mr. MENOCAL. It seems to me he ought to make the prices he uses correspond with the prices adopted by the Commission in making the comparison.

Senator MITCHELL. Was this statement of Mr. Morison's written since the supplemental report of the Commission had been filed?

Mr. MENOCAL. About the same time.

Senator MITCHELL. About the same time?

Mr. MENOCAL. Yes; I received this about two weeks ago from the society of which I am a member.

Senator MITCHELL. It is the same Mr. Morison who is a member of the Commission?

Mr. MENOCAL. Yes; and the paper is to be read before the society on the 5th of March. I have been requested to discuss it.

The CHAIRMAN. Do you expect to do it?

Mr. MENOCAL. Yes.

The CHAIRMAN. Now I will take up that first survey at the point where I left off, because I want to get the Senate in possession, in as simple a form as I can, of the real situation in Panama. When you got to Matuchin, from what direction did the river approach that place?

Mr. MENOCAL. From the eastward.

The CHAIRMAN. At that place, or near that place, did the river make a turn or bend?

Mr. MENOCAL. It does, almost at right angles.

The CHAIRMAN. In what direction did it run from there?

Mr. MENOCAL. It turns northward.

The CHAIRMAN. To the east or west of north?

Mr. MENOCAL. It is a little to the westward of north, I think.

The CHAIRMAN. So that the Chagres River there passing around the ridge, if I understand it, doubled upon itself?

Mr. MENOCAL. Yes, sir.

The CHAIRMAN. And went back. Having run in this direction it then came around and ran the other way?

Mr. MENOCAL. Yes; passing by the Bohio hills, and then Gatun, and from there to the sea.

The CHAIRMAN. Now, does the creek, or rivulet, or whatever you please to call it, empty into the Chagres River at or above that bend?

Mr. MENOCAL. You mean the Obispo. It enters just at the point of the bend, coming from the south.

Senator HANNA. Does the present Panama Canal route follow this bend in the river?

Mr. MENOCAL. It follows the river from this bend as far as a little below Bohio.

Senator HANNA. Does it make any right angle turn?

Mr. MENOCAL. The canal does not.

Senator HANNA. I do not care about which way the river runs; it is the route of the canal I want to know about.

The CHAIRMAN. When you got to the Obispo River, you left the Chagres, if I understand it, with your survey, and went up the Obispo?

Mr. MENOCAL. Yes.

The CHAIRMAN. What is the size of the Obispo?

Mr. MENOCAL. It is a very small stream.

The CHAIRMAN. Could it be called a river at all?

Mr. MENOCAL. No, sir.

The CHAIRMAN. Is it a small rivulet?

Mr. MENOCAL. It is a creek.

The CHAIRMAN. That creek heads in the direction of Culebra?

Mr. MENOCAL. In the direction of Culebra for a short distance, and then turns to the westward.

The CHAIRMAN. When you got to that point where the bend is at Matuchin, did you pursue the Chagres River from there up into the hills with your survey?

Mr. MENOCAL. Yes.

The CHAIRMAN. How far did you go?

Mr. MENOCAL. We went several miles up the river beyond the point where they proposed to build the Alhajuela dam.

The CHAIRMAN. About how far beyond that?

Mr. MENOCAL. Several miles.

The CHAIRMAN. "Several miles" does not mean anything to me.

Mr. MENOCAL. The reason I do not like to give exact figures is because I do not know the exact location of Alhajuela dam.

The CHAIRMAN. I do not mean you to be exact about it, but approximately.

Mr. MENOCAL. Well, I should say I went 4 or 5 miles.

The CHAIRMAN. Above Alhajuela?

Mr. MENOCAL. Yes.

The CHAIRMAN. How many days were you occupied in making that survey?

Mr. MENOCAL. Several weeks.

The CHAIRMAN. In making that survey were you careful to make it accurate?

Mr. MENOCAL. Yes; the surveys were perfectly accurate.

The CHAIRMAN. How did you find the country there?

Mr. MENOCAL. The country through which the Chagres River runs above Alhajuela is very broken.

The CHAIRMAN. Hills shutting down on either side of the stream?

Mr. MENOCAL. Yes; and high bluffs worn off by the current of the river, gravel and sand banks in places, and, in places where the valley expands, numerous creeks and narrow valleys coming in from both sides.

The CHAIRMAN. In what month was this? Was it in the wet season or the dry season that you made that survey?

Mr. MENOCAL. In the dry season.

The CHAIRMAN. In making your survey, wherever you went along the Chagres River, did you go along the bank or in the river itself?

Mr. MENOCAL. Our survey was conducted right along the bed of the river from Matachin.

The CHAIRMAN. Do you mean without going ashore at any place?

Mr. MENOCAL. We never went ashore except on some of the short bends of the river and over the gravel banks; on the bends of the river we used to go across, but otherwise we made our surveys right in the bed of the river.

The CHAIRMAN. The water was low enough for you to do that?

Mr. MENOCAL. Very low.

The CHAIRMAN. What month was that?

Mr. MENOCAL. It was in the months of February, March, and April.

The CHAIRMAN. So that your survey was made actually in the bed of the river?

Mr. MENOCAL. In the bed of the river.

The CHAIRMAN. During those months?

Mr. MENOCAL. Yes, sir.

The CHAIRMAN. Was that true of the survey that you made above Alhajuela also?

Mr. MENOCAL. Yes. The higher we went the less water there was flowing in the river.

The CHAIRMAN. How was it between Matuchin and Bohio?

Mr. MENOCAL. There we left the bed of the river. The river there is deeper.

The CHAIRMAN. At what point did you leave the bed of the river?

Mr. MENOCAL. We left the bed of the river at Matuchin.

The CHAIRMAN. And then you went down the shore of the river?

Mr. MENOCAL. Our canal line does not run along the river, but some distance from it, so we were entirely away from the bed of the river.

The CHAIRMAN. From Bohio, I suppose, your canal line would leave the river to the left?

Mr. MENOCAL. Yes.

The CHAIRMAN. And you would be some distance from it?

Mr. MENOCAL. Yes.

The CHAIRMAN. Through what kind of a country did your canal line run between Bohio and Colon?

Mr. MENOCAL. Through a flat, swampy country. That is to say, between a point to the eastward and opposite more or less to Bohio; from there to Colon the country is very flat and swampy.

The CHAIRMAN. Covered with what kind of a growth?

Mr. MENOCAL. Why, the usual growth in tropical countries—in the swamps—which consists of canes, mangroves, coarse grass, and such things.

The CHAIRMAN. You have been across that country since that time?

Mr. MENOCAL. Many times.

The CHAIRMAN. You say the canal run by the Panama Canal Company is not located exactly on the same line that you surveyed from Bohio to Colon?

Mr. MENOCAL. No, sir.

The CHAIRMAN. Is it located on any better site?

Mr. MENOCAL. I do not think so.

The CHAIRMAN. Your line did not cross the river?

Mr. MENOCAL. No, sir; only at Matuchin by a viaduct.

The CHAIRMAN. How many times does their line cross the river?

Mr. MENOCAL. Well, as located by the French company it crosses the river at numerous points, perhaps twenty.

The CHAIRMAN. As actually dug out?

Mr. MENOCAL. Twenty times, perhaps.

The CHAIRMAN. So that the Panama Canal Company kept right down the Chagres River?

Mr. MENOCAL. Yes.

The CHAIRMAN. What was your reason for not locating your canal in the Chagres River?

Mr. MENOCAL. In the first place, on account of the torrential nature of the river in its upper section, and in the lower portion we tried to avoid receiving the waters of the river into the canal, for fear that it would silt up.

The CHAIRMAN. You never admitted the waters of the Chagres River into your canal, the one you located 124 feet above the sea level at Obispo, except through that conduit that was brought down from Alhajuela?

Mr. MENOCAL. That was the only connection we had with it.

The CHAIRMAN. And you distributed that into a basin first, and then it ran into the canal from the basin?

Mr. MENOCAL. Yes, sir.

Senator HANNA. What kind of a dam did you propose to construct there?

Mr. MENOCAL. At Alhajuela?

Senator HANNA. Yes, sir.

Mr. MENOCAL. A stone dam.

Senator HANNA. Did you find the same difficulties with reference to foundation at that point?

Mr. MENOCAL. I did not make any borings, but the indications were that there was a rock foundation there.

Senator HANNA. What indications did you have on the surface?

Mr. MENOCAL. Well, the surface indications were that the foundations would rest on rock.

Senator HANNA. What were the surface indications where they proposed to build the present dam?

Mr. MENOCAL. I suppose about the same.

Senator HARRIS. Are you alluding to the dam at Alhajuela?

Senator HANNA. I am alluding to the dam that the present canal company proposes to build.

Mr. MENOCAL. Well, there are two dams proposed; one proposed at Alhajuela, 170 feet high, and another at Bohio.

Senator HANNA. Are both dams necessary for the operation of the canal for supplying water?

Mr. MENOCAL. Yes.

Senator HANNA. Where did you propose to build your second dam?

Mr. MENOCAL. I did not propose to have a second dam.

Senator HANNA. One was sufficient in your case?

Mr. MENOCAL. Yes.

Senator HANNA. And two are necessary in the present case?

Mr. MENOCAL. Yes.

The CHAIRMAN. Your canal had 124 feet elevation above the level of the sea at Obispo?

Mr. MENOCAL. Yes.

The CHAIRMAN. And it was only 24 feet deep?

Mr. MENOCAL. Twenty-four feet deep.

The CHAIRMAN. Sixty feet wide in crossing the Chagres?

The CHAIRMAN. The canal that is proposed to be built there now by the Panama Canal Company is probably of twice those dimensions.

Mr. MENOCAL. Very likely, in width.

The CHAIRMAN. In order to avoid the Chagres River coming into contact with your canal and having its torrential force let in upon the canal you proposed a viaduct across the Chagres a thousand feet long?

Mr. MENOCAL. Yes; about that length.

The CHAIRMAN. That was a stone structure?

Mr. MENOCAL. Yes.

The CHAIRMAN. Built upon arches?

Mr. MENOCAL. Yes.

The CHAIRMAN. That would span the entire Chagres River?

Mr. MENOCAL. The entire valley.

The CHAIRMAN. And the entire valley?

Mr. MENOCAL. Yes; at an elevation of 124 feet on the canal.

The CHAIRMAN. Then when you went on with your survey up the

Obispo Creek, in the direction of Alhajuela, did you follow the present line of canal now being constructed by the Panama company?

Mr. MENOCAL. For the conduit?

The CHAIRMAN. Did the axis of the canal follow the present line?

Mr. MENOCAL. From Obispo to Panama, very nearly the same line.

The CHAIRMAN. Was that a straight line?

Mr. MENOCAL. Practically so.

The CHAIRMAN. Did it have any curves in it?

Mr. MENOCAL. A few, with a very large radius, so that it was practically a straight line, until it comes near the coast. And then we have some curves.

The CHAIRMAN. In crossing the Culebra hills, at what elevation did your canal cross?

Mr. MENOCAL. Do you mean the elevation of the surface of the water in the canal, or the elevation of the ground?

The CHAIRMAN. The elevation of the ground with reference to the sea level.

Mr. MENOCAL. On the axis of the canal?

The CHAIRMAN. Yes.

Mr. MENOCAL. Well, I can not remember, but somewhere about 300 feet above sea level.

The CHAIRMAN. Three hundred feet?

Mr. MENOCAL. Something like that.

Senator HARRIS. Before you leave the question of curvature there, I should like to have your opinion as to the curvature in the canal. What do you think is the smallest radius that is admissable in the construction of a canal of the dimensions that are now contemplated?

Mr. MENOCAL. I think 4,000 to 5,000 feet should be accepted as a good radius for the canal, to give easy navigation.

Senator HAWLEY. Five thousand feet.

Mr. MENOCAL. From 4,000 to 5,000.

Senator HARRIS. In the report of the Commission it mentions a curve which exists on the Panama company's line of 3,280 feet.

Mr. MENOCAL. Yes; I have seen that.

Senator HARRIS. That is the sharpest curvature that is mentioned on their route.

Mr. MENOCAL. Yes; I think I have a statement prepared from that report in regard to the curvature.

Senator HARRIS. I should be glad to have that.

Mr. MENOCAL. If you will kindly look at this statement, you will see that the curvature per mile is very much larger in Panama than it is in Nicaragua.

Senator HARRIS. Per mile?

Mr. MENOCAL. Yes; in proportion.

Senator HARRIS. It shows a greater sharpness of curvature?

Mr. MENOCAL. Yes.

Senator HANNA. Greater sharpness of curvature in the Panama Canal?

Mr. MENOCAL. The sharpest curve is in the Panama, and the curvature per mile is very much larger in the Panama Canal than in Nicaragua.

Senator HANNA. That is, the curves are much easier for a vessel in the Panama route.

Senator HAWLEY. I do not understand it to be that way.

The CHAIRMAN. Just the other way. The percentage in the Panama Canal is 46 per cent.

Senator HANNA. I did not find any such fact as that. The average curves in the Panama are a great deal easier than the average curves in the Nicaragua, according to the Commission's report.

Mr. MENOCAL. Of course, there is a less actual mileage of curves in the Panama Canal, as it is much shorter than Nicaragua.

Senator HARRIS. The greatest curvature per mile on the Panama route is 15 degrees 48 minutes, as they figure it, and on the Nicaragua route 12 degrees and 44 minutes. Of course a 15-degree curve is a sharper curve than a 12-degree curve; and the sharpness of the curvature is greater on the Panama line than it is on the Nicaragua.

Mr. MENOCAL. And as to the length of canal in curves, you will see it is 46 per cent of the total length in Panama and 27 per cent in Nicaragua.

The CHAIRMAN. We will incorporate the table which Mr. Menocal has prepared.

The table is as follows:

Relative curvatures in canal routes.

	Panama.	Nicaragua.
Length of route .....miles..	49.09	183.66
Minimum radius .....feet..	3,281	4,045
Number of curves.....	29	56
Curves per mile of canal.....	0.59	0.30
Total canal in curve.....miles..	22.85	49.29
Curvature per mile of canal.....mile..	0.46	0.27
Total degree of curvature	771° 39'	2,339° 50' 30"
Degrees of curvature per mile	15° 48' 12"	12° 44' 24"

Senator HANNA. I want to mention right there in that connection that the curvature is not in the canal, but is in the bay, where the width of the channel is 500 feet, and it makes a good deal of difference whether you take a channel 75 or 100 feet wide or a channel 500 feet wide, which it is in the harbor, and in one place 800 feet wide.

Senator HARRIS. It is a part of the canal.

Senator HANNA. Oh, it is not a part of the canal at all. That is at the starting point. I want to go on record as making the point that this curvature is not in the canal proper, but is in the harbor, with a basin 500 or 800 feet wide as a channel; and I know something about turning a vessel in a space like that. I know it is a very easy proposition.

The CHAIRMAN. Is that in Colon Harbor?

Senator HANNA. In Colon Harbor.

Senator HARRIS. There is a provision for widening the channel.

Senator HANNA. I want a distinction drawn in this testimony between a curvature in a canal 75 or 100 feet wide and a curvature in a harbor with a bay that you can make as wide as you please by dredging.

Senator HARRIS. There is no minimum curvature in the Nicaraguan line where the channel is not also widened, and the Commission state the percentage which they give there.

Senator HANNA. That may all be.

Senator HARRIS. Where they widen it—where the curvature is sharp.

Thereupon, at 12.15 p. m., the committee adjourned until 3 p. m.

The committee met at 3 o'clock p. m.

Present: Senators Morgan (chairman), Kittredge, Harris, Hawley, and Hanna.

ADDITIONAL STATEMENT OF A. G. MENOCAL.

The CHAIRMAN. You stated you had been several miles, I believe as many as 5 miles, above the site of the Alhajuela dam, up the Chagres River?

Mr. MENOCAL. Yes, sir.

The CHAIRMAN. Did you find the stream there bold, or was it otherwise?

Mr. MENOCAL. The indications were that the stream there was torrential in times of flood. The banks were very steep and in some places almost vertical, with marked indications of having been worn-out by the action of the water.

The CHAIRMAN. How was it when you were there?

Mr. MENOCAL. It was very dry.

The CHAIRMAN. Describe it as well as you can.

Mr. MENOCAL. There was very little water in the river.

Senator HANNA. That is the Chagres River?

Mr. MENOCAL. Yes.

The CHAIRMAN. Above Alhajuela?

Mr. MENOCAL. Yes.

The CHAIRMAN. Did you find any affluents, any streams coming into it?

Mr. MENOCAL. Not any running; not any containing water. There were a good many dry creeks and narrow valleys that empty into the Chagres in the rainy season, I am sure, but at the time I made the surveys they were not running; they were all dry.

Senator HANNA. How many months out of the twelve do you call the rainy season?

Mr. MENOCAL. About eight. The dry season extends from four to five months.

The CHAIRMAN. Is the watershed of that part of that river precipitous or otherwise?

Mr. MENOCAL. Rather precipitous.

The CHAIRMAN. So that the flowing of water upon it would come down, as you say, torrential?

Mr. MENOCAL. Yes.

The CHAIRMAN. That means with great rapidity and force?

Mr. MENOCAL. Yes; in torrents.

The CHAIRMAN. Is that country heavily wooded, or is it otherwise?

Mr. MENOCAL. Yes; there is a good deal of timber in it.

The CHAIRMAN. A tropical growth?

Mr. MENOCAL. Yes.

The CHAIRMAN. I mean that part that you went up above Alhajuela?

Mr. MENOCAL. Yes. It is not high timber, but it is all covered with vegetation more or less. A great deal of it is nothing but undergrowth, and weeds, and small trees, but in some places you meet patches of quite high trees.

Senator HANNA. Are you speaking of it with reference to the time you were there, or are those the conditions now?

Mr. MENOCAL. At the time I was there. I have not been there for twenty-five years.

The CHAIRMAN. Twenty-five years?

Mr. MENOCAL. Yes.

The CHAIRMAN. That is that part of it. You have been along the Panama Canal since then?

Mr. MENOCAL. I have been on the Panama Canal, yes, sir; but not up the Chagres.

The CHAIRMAN. You made an accurate survey up there, did you, of the levels; took the levels all through there?

Mr. MENOCAL. We only took the levels along the bed of the river. We did not take the levels of the surrounding country. We did not make a survey of the topography.

The CHAIRMAN. And then you projected a conduit from somewhere in the vicinity of Alhajuela down the line of the canal?

Mr. MENOCAL. Yes.

The CHAIRMAN. About what distance?

Mr. MENOCAL. In the neighborhood of 10 miles. I could not remember exactly, but in the neighborhood of 10 miles.

The CHAIRMAN. Through what part of the country was that conduit run?

Mr. MENOCAL. Through broken country.

The CHAIRMAN. Rocky country?

Mr. MENOCAL. Not in all places, but what I mean by broken is low valleys, deep ravines, and high hills that would have to be cut through in order to complete this conduit.

The CHAIRMAN. Then, when you come down to Obispo, or in that vicinity, you were to form a basin.

Mr. MENOCAL. We proposed to have a basin there for the distribution of the waters on the canal.

The CHAIRMAN. About how large?

Mr. MENOCAL. Not very large; perhaps a thousand acres or so; I do not remember the dimensions now.

The CHAIRMAN. Did you make any recognizance or survey of the basin from there down to Bohio?

Mr. MENOCAL. No, sir.

The CHAIRMAN. None at all?

Mr. MENOCAL. No, sir.

The CHAIRMAN. In the canal basin at Bohio, covering 30 or 35 square miles and retained by what is called the Bohio hills running in there, or the Obispo hills running in there, with an outlet at a depression in those ridges, or in that ridge toward the headwaters of the Gigante, would it be necessary, in order to establish that lake there for navigation purposes, that the timber should be removed from that surface?

Mr. MENOCAL. I think so.

The CHAIRMAN. It would not do to leave any trees there, or stumps?

Mr. MENOCAL. Not in that portion which is going to be used for navigation or for the anchorage of ships.

The CHAIRMAN. In making the canal of the size and of the dimensions that is being made now by the Panama Canal Company between Obispo and Bohio—that is a distance of 14 miles, is it not?

Mr. MENOCAL. Something like that, sir.

The CHAIRMAN. In making the canal, is it necessary to canalize the ground from Obispo to Bohio?

Mr. MENOCAL. Not if the water is raised as proposed by the Bohio dam. The canalization then would be comparatively short.

The CHAIRMAN. There would be some?

Mr. MENOCAL. Yes; but very little of it, I think. I have not seen the plans.

The CHAIRMAN. If the water was raised as proposed by the Bohio dam, the canalization would be very short?

Mr. MENOCAL. Yes; I think so.

The CHAIRMAN. What would be the effect, in your opinion, as an engineer, upon allowing the waters of the Chagres River to debouche without control into Lake Bohio?

Mr. MENOCAL. Well, I think that unless there are controlling works there to regulate the floods as they approach the canal that there would be a considerable disturbance at the point where the river meets the canal proper, and that unless the banks are very well protected that some injury might be done to the canal.

The CHAIRMAN. If you have no channel through there you do not have any canal there to injure?

Mr. MENOCAL. Well, there would be a channel. A canal is supposed to be formed by the building of the dam at Bohio and the water would be raised enough at Matachin, where the river comes into the basin, to make that portion of the canal navigable without excavation.

The CHAIRMAN. Have you seen the Chagres River on various occasions?

Mr. MENOCAL. Oh, very many times; yes, sir.

The CHAIRMAN. Have you seen it at its flood?

Mr. MENOCAL. Not in the highest. I have seen it in freshets, but I never saw it in one of the highest floods.

The CHAIRMAN. Did you know the character of the Chagres River as to its rapidity of movement in time of flood when you projected the canal line there that you laid down?

Mr. MENOCAL. Why, so far as the velocity is concerned, we estimated it to be no less than 10 miles an hour.

The CHAIRMAN. Well, did you know about the characteristics of the Chagres River in floods and also at time of depression; at the time that you laid out this line of canal there?

Mr. MENOCAL. I obtained all the information I could in relation to it, but I did not see the river in one of the high floods.

The CHAIRMAN. You had not then seen it?

Mr. MENOCAL. No, sir.

The CHAIRMAN. But you have since seen it in the highest——

Mr. MENOCAL. Not the highest, but I have seen it in time of freshet; yes, sir; when the water was perhaps 15 or 20 feet higher than the low stage, or perhaps more.

The CHAIRMAN. Was it the characteristics of the river in time of flood that caused you to leave it out of your canal project and to build a viaduct across.

Mr. MENOCAL. Yes, that was the only reason.

The CHAIRMAN. Now, describe the river when you have seen it in flood, its effect in the way of bringing down timber and silt and stones, or anything of that sort.

Mr. MENOCAL. Why, the river in times of freshets and floods is charged with enormous amounts of sediment, and brings down timber and masses of grass, and anything that a force of water can move, from the valley of the river. The waters are surcharged with sediment in proportion to the magnitude of the floods.

The CHAIRMAN. Well, where does that sediment find its place of deposit as matters are now?

Mr. MENOCAL. On the lowlands next to the coast when the river overflows, or it is carried to sea by the force of the current.

The CHAIRMAN. Where would that sediment be expected to and where would it lodge in the event of a dam at Bohio large enough to cover a lake covering 35 acres of ground?

Mr. MENOCAL. My belief is it will fill up the lake in a short time—a comparatively short time; maybe twenty or twenty-five years. I do not see how it can be prevented.

The CHAIRMAN. You are speaking now of your own observations upon that torrent, upon that water?

Mr. MENOCAL. Yes, and from my engineering experience, that when the waters are loaded with sediment, the moment they come to rest, or the velocity is checked, the sediment is dropped to the bottom.

The CHAIRMAN. Do you know of, or do you believe that, any contrivance can be put into the Chagres River between Bohio and Alhajuela that will prevent the precipitating of this sediment?

Mr. MENOCAL. No; I do not.

The CHAIRMAN. You think that in any event the floods in that river would bring down sediment enough to silt up the lake?

Mr. MENOCAL. In the course of time I think it will.

The CHAIRMAN. About how much time?

Mr. MENOCAL. Why, I do not know as to that. It may be twenty years, or it may be more or less. It is very difficult to say, because it will depend altogether on the number and magnitude of the floods that may flow during a given time, so that it would be a very rough guess and of no value whatever.

The CHAIRMAN. Put it in this form: Would you, as an engineer, locate a lake with the expectation that you could escape the necessity of dredging to remove the silt that would be brought down by the Chagres River?

Mr. MENOCAL. I beg your pardon, Senator. What is that question?

The CHAIRMAN. Would you, as an engineer, expect to be able to locate a lake at Bohio covering 35 square miles of ground which would escape the necessity of being dredged in order to keep it at a proper depth?

Mr. MENOCAL. I do not see how it can be done. If a lake is created there it is bound to receive the sediment brought down by the river. That is an inevitable result of conditions well known in hydraulic engineering. The river will, when in flood, emerge from its narrow, steep channel and confining, high banks above Obispo, its waters surcharged with sediment, and with torrential velocity rush into the proposed lake. As it expands in the wider portions of the lake the velocity is suddenly checked, and the sediment dropped to the bottom. The amount and character of the sediment carried down by the water will be proportional to the magnitude of the floods, but the same conditions, more or less aggravated, will obtain at each of the several floods of the river during the rainy season. The silting up of the lake will necessarily follow, and in time navigation will be impaired by reason of reduced sectional area and strong current in the channel; the river will build a new régime for itself through the lake; the means proposed for regulating the floods of the river, as well as for the storage of a water supply for operating the canal in the dry season, will come to naught,

and the usefulness of the canal irretrievably lost. Conditions similar to those here described were found to exist above the Austin, Tex., dam before that structure was carried away. Any attempt to maintain the depth in the lake by dredging over its superficial area of 38 square miles, while the sediment is pouring in with every freshet in the river, would be a hopeless task.

The CHAIRMAN. Do you consider that an important factor in this matter?

Mr. MENOCAL. I do; very important. I think it is one of the most important problems connected with it.

The CHAIRMAN. Have you been on the Chagres River at any time when it moved bridges, whether railroad or any other constructions there?

Mr. MENOCAL. I have seen it carry away small houses some few feet above the normal level of the river, but I have not seen it carry away bridges. I have seen bridges that have been displaced by the action of the river, but I saw them after the flood had subsided.

The CHAIRMAN. You saw the effect of it?

Mr. MENOCAL. I saw the effect of it.

The CHAIRMAN. What bridges were they?

Mr. MENOCAL. Barbacoa bridge.

The CHAIRMAN. A railroad bridge?

Mr. MENOCAL. Yes.

The CHAIRMAN. About what is the height of that bridge above the normal condition of the river?

Mr. MENOCAL. About 40 feet.

The CHAIRMAN. How long is the bridge?

Mr. MENOCAL. Four or five hundred feet long.

The CHAIRMAN. Was this removal that you saw at either end of it or in the middle?

Mr. MENOCAL. The girders of the bridge were removed from all of the piers, more or less. They did not fall, but were displaced from their position and had to be brought back afterwards.

The CHAIRMAN. You stated the height at which you put the viaduct across that river, but I do not recall it.

Mr. MENOCAL. I do not remember it, but I know that I put it above the level of the highest floods and gave some little margin besides; but I do not remember the elevation now. It is many years since I looked into those plans.

The CHAIRMAN. You made no provision in your survey for shutting the waters of the Chagres River out of your canal?

Mr. MENOCAL. No, sir.

The CHAIRMAN. Well, in the present situation there, where the canal of the Panama Canal Company crosses the Chagres River, some. I believe you said twenty-odd times——

Mr. MENOCAL. Yes.

The CHAIRMAN. It must be that the canal follows almost literally the bed of the river?

Mr. MENOCAL. Not necessarily. It intercepts the river; the river is very tortuous, and the canal cuts across some of the bends.

The CHAIRMAN. It runs right up the valley into the river, passes backward and forward?

Mr. MENOCAL. Yes.

The CHAIRMAN. In a serpentine way?

Mr. MENOCAL. Yes.

The CHAIRMAN. And cuts across?

Mr. MENOCAL. Yes; cuts across the bends.

The CHAIRMAN. Now, is it necessary, in your opinion as an engineer, for the purpose of maintaining the navigation of the canal from Colon to Obispo, that the Chagres River should be shut out?

Mr. MENOCAL. From Colon to Obispo, or to Bohio?

The CHAIRMAN. To Bohio, I mean, the lower place; yes, sir.

Mr. MENOCAL. Yes; I think so.

The CHAIRMAN. Well, in what way can that be done?

Mr. MENOCAL. By building embankments on both sides of the canal. That is the only way. That is the way proposed by the Commission. I suppose it is the only practicable way of doing it.

The CHAIRMAN. You say that is the way proposed by the Commission?

Mr. MENOCAL. Yes; the Commission proposes to build embankments on both sides of the canal in order to keep the waters of the river out of the canal and prevent silting up.

The CHAIRMAN. Now, is the material necessary to make those embankments permanent—first, I will ask you what would be the length of them, how long?

Mr. MENOCAL. I am not prepared to say exactly. I may approximate it. I suppose it would be about 8 miles on each side, making altogether 15 or 16 miles of embankment, possibly.

The CHAIRMAN. And that embankment would necessarily shut the waters of the Chagres River out of the canal?

Mr. MENOCAL. Ought to, if they are properly built.

The CHAIRMAN. Well, would the canal be safe without it?

Mr. MENOCAL. I think not.

The CHAIRMAN. I had my mind on the proposition as to whether the canal was possible without the embankments.

Mr. MENOCAL. No; I think not. I think they must be built.

The CHAIRMAN. Where would the earth come from to make those embankments permanent? Could you get it from the neighborhood of the canal?

Mr. MENOCAL. The material excavated from the canal is not fit for the building of the embankments.

The CHAIRMAN. Why?

Mr. MENOCAL. Because it is too soft and will not stay in the position where it is deposited. I went through portions of the Panama Canal a few months after the prism of the canal had been excavated and I found that the material that had been dumped on both sides by the dredges had disappeared almost entirely; it had run back to a very flat slope and run into the swamps, and in some places there were no indications whatever that any material had been deposited along the canal.

Senator HANNA. Was that intended to be made a bank of the canal, that material? They had to get rid of it.

Mr. MENOCAL. They had to get rid of it and the material was excavated and dumped on the banks, and in a very few months afterwards, as I say—

Senator HANNA. No matter what the material was, they put it out anyway.

Mr. MENOCAL. Yes. I meant to say that the embankment proposed could not be built from the material excavated from the canal. It is not suitable.

The CHAIRMAN. It had to be brought from somewhere else?

Mr. MENOCAL. It had to come from high ground in the vicinity.

The CHAIRMAN. Well, would it require some railroad structure or something of that kind to bring it in?

Mr. MENOCAL. I see no other way; it must be done.

The CHAIRMAN. By railroad?

Mr. MENOCAL. By railroad; and a good deal of the material will sink into the swamps before a firm footing for the embankment can be obtained, and if you look into the history of the construction of the Panama Railroad you will find that the engineers had a great deal of difficulty in building embankments across portions of the swamps.

Senator HANNA. Compared with the valley of the San Juan and the Nicaragua rivers would you not have the same thing there to contend with?

Mr. MENOCAL. Not quite. In some places in the upper valley of the San Juan you may find sections of the swamps that would be quite soft; lower they are not so soft as the swamps along the coast at Panama. In Nicaragua the swamps back of Greytown for several miles have a sandy, firm bottom. There may be 2 or 3 feet of soft material, rotten vegetation, or something of that sort at the bottom, but 6 or 8 feet below the level of the water you find a coarse sand which when excavated and deposited on the side forms an embankment that will stand to an angle of 45 degrees. That was our experience in dredging back of Greytown, and the material dumped by the same dredges used in the Panama Canal is still standing there in the same position in which it was deposited. The slopes of the excavations were in places at an angle of 45 degrees or steeper, and the prism of the canal has retained its size and depth exactly. There has been no change in that. I mention this to show you the difference between the nature of the ground in both places. In Panama you get this ooze, this soft mud that has no consistency whatever.

The CHAIRMAN. Would there be any difficulty in constructing margins of the canal so as to hold an embankment that would keep the waters of the Chagres off?

Mr. MENOCAL. Well, I suppose the embankments will have to be built some distance from the edge of the excavation, otherwise the pressure exerted by their weight might cause sliding into the canal.

The CHAIRMAN. Now, I speak from that area on which the embankment would be placed, whether it is close or distant in that flat country, would there be difficulty in getting ground of sufficient integrity there to sustain the embankment?

Mr. MENOCAL. A firm footing will have to be made; that is to say, the foundation of the embankment will have to be made by dumping materials in the swamps.

The CHAIRMAN. What kind of material?

Mr. MENOCAL. Any heavy soil, clay; any material that can be obtained in the vicinity.

The CHAIRMAN. About how far would that have to be brought at the nearest point?

Mr. MENOCAL. I am not prepared to say exactly, but I suppose 5 or 6 miles, perhaps more. The Panama Railroad had the advantage of curving around hills. They were able to pick up some solid ground on which to build the road, but they had much difficulty in crossing sections of the swamps. Consequently the length of the embankment

built by the railroad was not as long as would have to be built in order to protect the canal from the waters of the Chargres.

The CHAIRMAN. When you say that you were there a few months after the prism of the canal had been dredged, and that the stuff that was thrown out had disappeared——

Mr. MENOCAL. Almost.

The CHAIRMAN. Do you mean that it had sunk, or what had become of it?

Mr. MENOCAL. Well, it had disappeared. I asked that question myself, what became of that material. "Oh, well, it has spread into the swamps and has disappeared; it would not stand by itself," I was told. The swamps did not seem to have changed their level; they seemed to be about the same as before the material was deposited there.

The CHAIRMAN. From what distances—what length of the line of the canal was this want of material, this appearance of the absence of material?

Mr. MENOCAL. It would be until you strike solid ground at Gatun or above Gatun; I think for about 8 miles from Colon.

The CHAIRMAN. I shall now ask you some questions in regard to your survey through the Culebra hills. The railroad was there when you made your survey?

Mr. MENOCAL. Yes.

The CHAIRMAN. Why did you not follow the line of the railroad in making your survey?

Mr. MENOCAL. The line that we followed was more direct, in the first place, and in the second place, we did not want to disturb the railroad if it could be avoided. The railroad had the lowest depression, but it was not the most direct.

The CHAIRMAN. Is that Culebra range or ridge, whatever it is, a continuous ridge of land with gaps through it?

Mr. MENOCAL. Yes; and the railroad occupies the lowest saddle.

The CHAIRMAN. Now, the railroad, if I comprehend the map, runs around one side of the hill we call Culebra, and the canal runs around the other side of the same hill. Is that right?

Mr. MENOCAL. Yes; the same ridge; the canal goes on the other side.

The CHAIRMAN. So that the Culebra hills appear between the canal and the railway?

Mr. MENOCAL. Yes.

The CHAIRMAN. You were compelled to make curves in the line, I suppose?

Mr. MENOCAL. Oh, yes.

The CHAIRMAN. Even for the small canal you were trying to lay down there?

Mr. MENOCAL. Yes.

The CHAIRMAN. In order to get those curves at a sufficient radius to admit of the free passage of vessels through the canal, did you have to get on higher ground sometimes?

Mr. MENOCAL. Yes; that is inevitable. Of course some elevations would be met in the way, and as we could not go around them the cheapest way would be to cut across.

The CHAIRMAN. You followed the very lowest depression you could carry the canal in order to get a direct route with proper curvatures?

Mr. MENOCAL. Yes.

The CHAIRMAN. You did not go on the railroad line because of what?

Mr. MENOCAL. Because we had to make a sharp curve in order to keep on the saddle on which the railroad is built.

The CHAIRMAN. That would be inevitable.

Mr. MENOCAL. Yes.

The CHAIRMAN. So that that curve itself would have driven you to the other line?

Mr. MENOCAL. Yes.

The CHAIRMAN. Now, since the canal has been built, if I understand you correctly, you have been frequently down there?

Mr. MENOCAL. I have, since the canal was commenced.

The CHAIRMAN. You have made no actual surveys since that time?

Mr. MENOCAL. No.

The CHAIRMAN. Have you made a careful examination of the situation there?

Mr. MENOCAL. I have, comparatively so, for the time I have been there.

The CHAIRMAN. Have you been there at any time when a landslide occurred?

Mr. MENOCAL. I have seen several landslides at Culebra, on the railroad, and also on the excavations for the canal.

The CHAIRMAN. Was that in the rainy season or in the dry season?

Mr. MENOCAL. I think it was in the rainy season; I am pretty sure.

The CHAIRMAN. Describe those landslides, whether they are important or not.

Mr. MENOCAL. The one I saw on the line of the Panama Railroad was important, so far as it stopped the running of the road for some time. One side of the hill just slipped down to an angle of perhaps not more than ten or twelve degrees, the material running across the track, and it took some two or three days in order to clear it.

Senator HANNA. You can find those things in this country without going to Panama.

Mr. MENOCAL. I suppose so. It is a kind of quicksand.

The CHAIRMAN. The top of Culebra Hill?

Mr. MENOCAL. Yes; a mixture of sand and clay, and very fine sand.

The CHAIRMAN. Is it of the same structure on the canal side as on the railroad side?

Mr. MENOCAL. On the top it is very much the same. I understand as they have gone down with the excavation to a greater depth a more compact material has been found, but I have not seen it.

The CHAIRMAN. At the place where you saw this landslide was it a precipitous, steep bank or a flat bank?

Mr. MENOCAL. Originally it was precipitous.

The CHAIRMAN. But at the time of the slide?

Mr. MENOCAL. The depth of the cutting was about 32 feet, and by continuous slides the slope had got to be very flat.

The CHAIRMAN. And it was very flat when you saw it?

Mr. MENOCAL. Yes; this material was still sliding down, and the slopes were all very flat.

The CHAIRMAN. Well, now, as an engineer, would you expect to find any better conditions on the other side of that hill than you found on the railroad side?

Mr. MENOCAL. No; I suppose that the top, corresponding to the same depth I observed on the line of the railroad, would be about the same.

The CHAIRMAN. What is about the distance across on the ridge of Culebra or the Imperidor from the edge of the cut on the right side to the edge of the cut on the left side of this canal?

Mr. MENOCAL. Between the——

The CHAIRMAN. What is the distance between the cuttings?

Mr. MENOCAL. In the cutting for the canal between the two slopes?

The CHAIRMAN. Yes.

Mr. MENOCAL. The crest of the two slopes?

The CHAIRMAN. Yes.

Mr. MENOCAL. I am not prepared to say. I have not been able to examine the plans.

The CHAIRMAN. About how much do you think it is?

Mr. MENOCAL. I am not prepared to state. I have not been able to see the plans, and I would not care to give an opinion.

The CHAIRMAN. In making your estimates for the maintenance of way of that canal, would you make any computation for the landslides that occur there?

Mr. MENOCAL. I think it ought to be done.

The CHAIRMAN. Have you ever attempted to make an estimate in your own mind as to what would be the amount to be allowed for that?

Mr. MENOCAL. No; I have not.

The CHAIRMAN. Would it be large?

Mr. MENOCAL. I am not prepared to say. I should think so, but I am not prepared to say.

The CHAIRMAN. You have made no measurements upon it?

Mr. MENOCAL. I have not.

The CHAIRMAN. And any calculations?

Mr. MENOCAL. No; I have not seen the ground personally since the excavation has been carried to its present depth. I only have seen reports of it.

The CHAIRMAN. You mean you have not seen it since it was dug down——

Mr. MENOCAL. To the depth at which it is now.

The CHAIRMAN. You saw it before?

Mr. MENOCAL. The descriptions I have seen in the reports are too incomplete for me to form an opinion from.

The CHAIRMAN. What was the health of your party while you were there?

Mr. MENOCAL. Not very good. We came very near losing three of our officers, and I myself was very ill, to the point of death, and we lost one or two men from the laboring gang.

The CHAIRMAN. Do you consider that a healthy country?

Mr. MENOCAL. I do not.

The CHAIRMAN. Do you consider it very unhealthy?

Mr. MENOCAL. Very unhealthy.

The CHAIRMAN. How does it compare with Nicaragua in that respect?

Mr. MENOCAL. I regard Nicaragua as very healthy.

Senator HANNA. How would it be at Nicaragua if you were digging a canal there?

Mr. MENOCAL. We did do some digging in the canal.

Senator HANNA. What I mean to ask is, there has been digging done pretty much the whole length of the Panama Canal, the earth has been turned up by excavations made. Suppose you had corre-

sponding excavations along the Nicaragua route from the valley of the San Juan River and you turned up the soil there, would you have any sickness from it?

Mr. MENOCAL. It is possible there may be some more sickness than they have now, but I can say this: We built 12 miles of railroad, 6 of which was in these swamps, and the men had to work in water from their feet to their necks, and we did not lose a man on account of sickness contracted by reason of the climate or the conditions under which the work was done. We had 1,800 men employed in the building of that railroad and we did dredging there for a distance of about seven-eighths of a mile into the swamps, and the condition of health of the people on board of the dredges was excellent, and those living in the vicinity just the same. I was not ill there myself, nor were the other engineers. We had cleared the timber for about 9 miles from Greytown and about 10 miles on the west side of the lake, and we did not have any illness on that account.

The CHAIRMAN. Is that remark true through the entire line to Brito in regard to health?

Mr. MENOCAL. It is claimed, and I believe, that the more you go west the healthier it is. I would like to call the attention of the committee to one matter, if I am permitted to do so.

The CHAIRMAN. Oh, yes.

Mr. MENOCAL. I refer to one condition in Nicaragua which does not exist in Panama. It is very true that we have swamps back of Greytown extending several miles, but the rainfall is so great that the water in the swamps is renewed constantly. You can drink it at any place. We used to drink it constantly.

Senator HAWLEY. It is not stagnant?

Mr. MENOCAL. It is not stagnant. It is being renewed all the time from the heavy rains, while in Panama in the four or five months of dry season the swamps get dry, and then is when the sickness prevails. That is the time that the country becomes extremely unhealthy. It is not in the rainy season. What I fear is the dry season.

The CHAIRMAN. What effect do the trade winds have in Nicaragua, according to your opinion?

Mr. MENOCAL. The healthy condition of Nicaragua is partly attributable to the trade winds blowing up the valley of the San Juan, and I believe it is correct.

Senator HANNA. Let me ask you, what year did you do this work that you are talking about in Nicaragua?

Mr. MENOCAL. From 1887 to 1892.

The CHAIRMAN. But, if I understand you, you have practically lived in Nicaragua for a number of years?

Mr. MENOCAL. Yes; but the Senator refers to the work.

The CHAIRMAN. That is the railroad work.

Mr. MENOCAL. The railroad work and for the canal.

Senator HANNA. That was for the Maritime Canal Company?

Mr. MENOCAL. Yes.

The CHAIRMAN. I want to get, if you remember it, the steepness of the grade in the river about, from Alhajuela down to Obispo.

Mr. MENOCAL. From Alhajuela to Obispo?

The CHAIRMAN. Yes.

Mr. MENOCAL. I could not give it, sir; I do not remember it. If I had known that the investigation would reach those points I would have been prepared for it.

The CHAIRMAN. Is it very steep?

Mr. MENOCAL. Oh, yes; very steep. The bed of the river rises very rapidly all the distance from Bohio to the headwaters, and that is what makes the river a torrent.

Senator HARRIS. The peaks run up sharp and high as you go upstream?

Mr. MENOCAL. Yes.

Senator MORGAN. I do not care to examine Mr. Menocal any further myself.

Senator HANNA. You say you have not been there for twenty-five years?

Mr. MENOCAL. Not up the headwaters of the Chagres.

Senator HANNA. How long since you have been along the route of the Panama Canal?

Mr. MENOCAL. Not since 1889.

Senator HANNA. Did you go there as an expert at that time?

Mr. MENOCAL. No; I went there to examine the dredges that had been working in the Panama Canal with the intention of buying them for the Maritime Canal Company.

Senator HANNA. Did you know anything about the examinations made by the international engineers at the time that the New Panama Canal Company was organized?

Mr. MENOCAL. Several technical commissions have reported on the Panama Canal. Do you mean that commission of which General Abbot was a member?

Senator HANNA. Yes.

Mr. MENOCAL. Yes; I am familiar with it.

Senator HANNA. Did you ever have any consultations with any of those engineers with reference to it?

Mr. MENOCAL. No, sir.

Senator HANNA. Or were you ever consulted?

Mr. MENOCAL. No, sir.

Senator HANNA. Did you personally know those engineers?

Mr. MENOCAL. I know some of them by reputation.

Senator HANNA. What is their reputation?

Mr. MENOCAL. I think they are very good men; very able.

Senator HANNA. One from France, one from Germany, one from Holland, one from England, and one from the United States—does that comprise the board?

Mr. MENOCAL. Yes, just about.

Senator HANNA. Do you understand they were selected with reference to their ability and prominence in the field of engineering?

Mr. MENOCAL. I have no doubt they were selected in that way.

Senator HANNA. It was on their report and on their recommendation that the plans were changed with reference to the construction of the Panama Canal?

Mr. MENOCAL. Yes.

Senator HANNA. It was made a lock canal instead of attempting to make it sea level?

Mr. MENOCAL. The original proposition for a sea level was also indorsed by another commission composed of men selected with reference to their ability and prominence in the field of engineering.

Senator HANNA. Not composed of the same men?

Mr. MENOCAL. No; but they were supposed to be the best engineers

that could be found in Europe and in America. General Totten, who built the Panama Railroad, was one of them. That commission, which was very numerous, was supposed to be composed of the most eminent engineers of Europe and of America. De Lesseps told me after the Paris Congress, when I pointed out to him the difficulties he would meet with in building the Panama Canal at sea level, "Well, I suppose that there are very serious difficulties—just as serious as you have stated. But if you are given time and money all those difficulties will be overcome. I can raise all of the money that will be needed, and with that money I can build the canal; as to engineering skill, I will get it wherever it can be obtained, in France, in Germany, in England, or in your country."

Senator HANNA. The raising of the money was not the part that I was interested in. I wanted to know about the talent and ability of the engineers who have pronounced the Panama Canal as being executed by the company, the New Panama Canal Company, possibly, to a certainty of success with reference to construction and operation.

Mr. MENOCAL. My remark was made with reference to another commission which claimed that a sea-level canal could be built.

Senator HANNA. You are getting away from my question.

Mr. MENOCAL. I beg your pardon. I thought I had answered it.

Senator HANNA. I simply wanted to know upon what to predicate my judgment as to the experience and judgment and knowledge of the men by whom this last canal was recommended and is now in process of construction.

Mr. MENOCAL. Yes.

Senator HARRIS. Is it not a fact that in the case of the commission which pronounced a sea-level canal feasible, as well as in the case of this last commission which has approved the plans, none of them were men who had personally examined the ground?

Mr. MENOCAL. That is just the point, Senator.

Senator HARRIS. They were receiving their data——

Mr. MENOCAL. Those plans had been designed in offices and in various places, some in the United States and some in France, and the men were not familiar with the ground.

Senator HARRIS. They were received from data entirely through interested channels.

Mr. MENOCAL. Precisely, and from subordinates who did not attach sufficient importance to certain physical conditions which are indispensable in designing a work of this kind.

Senator HARRIS. It is somewhat similar to the board of engineers convened in New York in reference to the plans and operations of the Maritime Canal Company?

Mr. MENOCAL. Just the same.

Senator HARRIS. Which was very severely criticised on account of their indorsing the plans which they were receiving at secondhand and without personal knowledge of the ground.

Mr. MENOCAL. That is very true.

The CHAIRMAN. Did not this board of engineers, called the comité technique, adopt the plan of building a clay dam at Bohio?

Mr. MENOCAL. Yes.

Senator HARRIS. That is the French plan?

The CHAIRMAN. Which our engineers say is not practical.

Mr. MENOCAL. And they pronounce the practicability of the maintenance of the canal upon the basis of a clay dam at Bohio.

Senator HARRIS. And they also approve of the feature of the French engineers, which is the Alhajuela summit level, which has been eliminated by the Isthmian Canal Commission.

Mr. MENOCAL. Not only that, but they proposed to have Bohio Lake at 65 feet above sea level, and the Isthmian Canal Commission raised it to 85 feet. I do not remember the superficial area of the lake as proposed by the French commission, but it is very much smaller. It was an insignificant lake, which I am sure would have silted up in a very short time. The lower sections of the Panama Canal, which have been dredged out, silted up in a very short time. I went through a section of that canal two or three years after it had been excavated to the full section, and I could not get through it in a steam launch drawing only 4 feet of water.

The CHAIRMAN. Owing to the sediment in the waters of the Chagres?

Mr. MENOCAL. Yes.

Senator HANNA. The waters are loaded with sediment at the time of high flood.

Mr. MENOCAL. Not only high floods; low floods also bring more or less sediment.

Senator HANNA. At those times that surplus water is wasted through the spill?

Mr. MENOCAL. But after it has left the heavy sediment in the lake.

Senator HANNA. The lake is at times of normal height, and therefore when it is raised above its normal height the water that is coming down with the flood tide goes over the spillway and carries the sediment with it.

Mr. MENOCAL. It goes over the spillway after it has lost its velocity and dropped the sediment in the lake.

Senator HANNA. But it is going over it?

Mr. MENOCAL. Only the surface water, after having lost its velocity in the lake. After the velocity is checked in the lake the heavy sediment drops to the bottom and only the light substance held in suspension goes over the spillway.

Senator HANNA. There is some always goes down with the torrent that would stay long enough in it, so that you can not attribute all of the silt to that. I can not believe that.

Mr. MENOCAL. Some of the light stuff may remain in suspension for some time; that would go over the spillways, very true; but all of the heavy sediment brought down with these floods will certainly be deposited in that lake. It could not be otherwise.

Senator HARRIS. The moment the velocity is checked——

Mr. MENOCAL. Certainly. It could not be otherwise. It is a settling basin.

Senator HANNA. How about the Nicaragua Lake? Is that filling up?

Mr. MENOCAL. No, sir; you can not fill up the Nicaragua Lake, because it is 110 miles in length by 70 miles in width. The area is enormous. It fills up to some extent at the mouth of the various small rivers that feed it, but there is not a large torrential river coming into it, and the silting-up process is so slow as to have no practical effect in the depth of the lake.

The CHAIRMAN. Your question, Senator, reminds me of one that I wanted to ask. Suppose there is a dam at Alhajuela, what is the proposed height of that dam?

Mr. MENOCAL. One hundred and seventy feet.

The CHAIRMAN. Do you know of any dam in the world as high as that?

Mr. MENOCAL. I do not remember of any. The highest that I know of is about 150 feet high.

The CHAIRMAN. Now, I will suppose that the dam at Alhajuela is full, normal, and I will suppose that the lake at Bohio is full in its normal state, and then I will suppose that a heavy rain occurs above the dam at Alhajuela and those hills, and a flood comes down, what would be the effect of that upon the lake at Bohio?

Mr. MENOCAL. In that event, the lake will rise above the estimated highest level, and the water may run not only over the spillways with increased depth, but also over the lock gates. The dam is proposed to be raised about $7\frac{1}{2}$ feet above the highest level in the lake, and the water probably will not reach its crest but it may run over the lock gates.

The CHAIRMAN. Now, to provide against a danger of that kind, is it or is it not necessary to have regulation works on the Chagres River at the point where it enters the canal?

Mr. MENOCAL. No, sir; that will not stop it.

The CHAIRMAN. That would not stop it, you say?

Mr. MENOCAL. No, sir; there is nothing to stop such a flood as that under those conditions. It is bound to come down, because if the Alhajuela Lake is full and one of those high floods takes place, you could not build anything that would check the torrent.

The CHAIRMAN. Could it be controlled by regulation works at a place where the Chagres River enters at Obispo?

Mr. MENOCAL. No, sir; I do not know of anything that would stop such a flood.

Senator HANNA. Is it not true that the upper lake would not be full?

Mr. MENOCAL. Well, if the waters are to be stored there for feeding the canal, it should be kept full at the end of the rainy season.

Senator HANNA. They are not stored there; they are stored below. That is a precautionary dam, as I understand, to catch these floods, not to be full.

Mr. MENOCAL. But I think the principal object of this Alhajuela dam is to create a reservoir for feeding the canal during the dry season, and it is to be maintained nearly full of water at the end of the rainy season. The question of Senator Morgan, as I understand it, is that if the upper lake is full and the lower, Bohio lake, is, say, about elevation 90 or 92, which is estimated by the Commission to be about the highest level, and just as this flood is being discharged over the spillway another flood should take place, then matters would be very badly complicated.

Senator HARRIS. Well, is your idea based on the fact that the spillway is not ample to care for any combination of floods?

Mr. MENOCAL. No, sir; I do not think you could build a dam there that would create a reservoir large enough to hold in a flood of that kind.

Senator HARRIS. I am speaking now of the Gigante spillway.

Mr. MENOCAL. Oh, I beg your pardon.

Senator HARRIS. What I wanted to get at is whether you differ from the Commission in thinking this would not be ample?

Mr. MENOCAL. No; I would not differ with the Commission in the proposition stated in their report that the Gigante spillway is capable

of taking care of the largest floods that may take place, or as large as have taken place; but the question of the Senator was, Suppose that the lake is full to the maximum, to the highest point, and another high flood occurs?

Senator HARRIS. That combination has got to be met; that the Bohio lake is up to 90, and the dam being 10 feet higher and the discharge taking place already over the Gigante spillway—I think they give it 5 feet over the Gigante spillway—and that the Alhajuela Lake is also full at the same time. That is the combination.

Senator HANNA. Is that a possibility?

Mr. HARRIS. Well, that depends on the weather.

Mr. MENOCAL. You can not measure the intervals between the floods. They may come in rapid succession and they may come two weeks or two months apart.

The CHAIRMAN. I see that you gentlemen do not get the meaning of my question. Some of the gentlemen of the Panama Canal Commission recommend and adhere to a dam at Alhajuela, while others say it is not necessary. My question was put upon the hypothesis that it was necessary, and that the dam was there, and that the dam was full, and that there came one of these floods, and I wanted to find the effect of it upon the Bohio Lake when it came down the channel of the Chagres River in this torrential form and broke into that lake.

Mr. MENOCAL. Well, the waters of the lake will rise considerably, depending upon the magnitude of the flood, and the depth of the water in the spillway will also increase considerably beyond the estimated maximum height.

The CHAIRMAN. My question was directed especially to the question of current and the velocity and the effect of the current that would come through the Chagres River in the case I had supposed in the lake. Would it come in such form as to make a very great disturbance or no disturbance—would it spread itself out over the lake quietly or would it come so as to tear up whatever was there?

Mr. MENOCAL. It will spread over the lake just the same as all other floods. If it finds the lake full, that means that the lake is already expanded over a large area, so this additional flood will spread over that lake just the same as the other one, or better, because it has a larger area to spread over.

The CHAIRMAN. Without making the current larger?

Mr. MENOCAL. The current would not be any stronger than the current that will take place when one of these high floods come into Lake Bohio.

The CHAIRMAN. That is exactly what I am trying to find out.

Mr. MENOCAL. It would be just about the same so far as the current is concerned.

The CHAIRMAN. My question is this: In the absence of regulating works to bring that flood into Lake Bohio gradually, would the flood in that river in the torrential storms come in such a current as to make it dangerous, for instance, to navigation?

Mr. MENOCAL. I think it would be. I think the Commission admits that there are times when navigation may have to be suspended.

The CHAIRMAN. On that account?

Mr. MENOCAL. Yes.

The CHAIRMAN. The next question I want to ask you is, How frequently do these floods occur in the rainy season there?

Mr. MENOCAL. It depends a great deal upon the rainfall of the year. In some rainy seasons you have very frequent freshets and very high floods.

Senator HANNA. You are talking about the Panama now?

Mr. MENOCAL. Yes.

The CHAIRMAN. Talking about the Chagres River.

Mr. MENOCAL. At other times rains are not so frequent.

The CHAIRMAN. Do these floods occur at intervals of one or two or three months, or how is it in the rainy season?

Mr. MENOCAL. In a very wet, rainy season the floods are quite frequent. I would not dare say how frequent, but quite frequent; but not all of them reach a very high level.

Senator HANNA. I would like to ask if you are speaking from your own knowledge?

Mr. MENOCAL. Yes; because I have been there quite often. These very high floods, of course, that reach elevations of 39 or 40 feet above the low-water stage of the river are not frequent. Those will probably take place only once in every four or five years.

The CHAIRMAN. Now, you seem to be personally familiar with the ground of Panama, and also personally familiar with the ground of Nicaragua. You have stated how many surveys you have made there?

Mr. MENOCAL. Yes.

The CHAIRMAN. And how much attention you have given to the subject. Because of the surveys you have made at Nicaragua, have you discovered any point in your surveys which makes it doubtful as to the practicability of a canal there?

Mr. MENOCAL. I have not.

The CHAIRMAN. Do you feel certain as an engineer that a canal is practicable?

Mr. MENOCAL. I do.

The CHAIRMAN. On the Nicaragua River?

Mr. MENOCAL. I do.

The CHAIRMAN. Leaving the question of the selection of the lines aside entirely?

Mr. MENOCAL. Yes; I do under those conditions.

The CHAIRMAN. I ask you from the survey that you first made down to the last survey that has been made there and reported, including the one you made across the divide, a short line, have you any reason as an engineer to believe that either of those surveys is impracticable?

Mr. MENOCAL. I have not.

Senator HARRIS. In addition to the fact of your personal knowledge, you are also familiar with the surveys and opinions that have been made by other engineers in regard to it?

Mr. MENOCAL. Yes.

Senator HARRIS. Have you ever heard of any engineer condemning the Nicaragua route as impracticable?

Mr. MENOCAL. I have not.

Senator HARRIS. My impression has been that it never has been pronounced anything but feasible.

Mr. MENOCAL. I never heard an engineer condemn it as impracticable. There have been several routes——

Senator HARRIS. Oh, there are variations, of course.

Mr. MENOCAL. Yes, variations, but every one of them is practicable.

The CHAIRMAN. You are familiar with the harbor at Colon?

Mr. MENOCAL. I have been in and out of it many times; yes, sir.

The CHAIRMAN. Give a general description of it, if you please, and then I want to ask some questions based on that.

Mr. MENOCAL. The harbor of Colon is open to the sea, to north-erners.

Senator HARRIS. While we are on the Nicaragua line I would like to ask another question concerning that line. All of these various plans that have been proposed by yourself and all engineers contemplate the use of the upper part of the San Juan River, practicable for slack-water navigation.

Mr. MENOCAL. Yes.

Senator HARRIS. You do not regard the curvature of that upper water of the San Juan under any of the plans that you have examined—that of the Commission most particularly—as impracticable or unsafe in any way?

Mr. MENOCAL. Oh, not at all. There is nothing impracticable in them. They are perfectly feasible.

Senator HARRIS. And that it is available for navigation at night with the ordinary electric light?

Mr. MENOCAL. Just as well as in the daytime; yes, sir.

Senator HARRIS. So that in the 33 hours described by the Commission as the time of passage will mean 33 continuous hours, and not portions of three days as suggested?

Mr. MENOCAL. There is no reason why it should not be so. It has always been contemplated by me that the canal would be navigated day and night.

Senator HARRIS. The same as the Suez Canal is?

Mr. MENOCAL. Precisely, just the same; better than the Suez Canal. The Suez Canal goes through shallow lakes also. They have had to excavate canals through these lakes, and they navigate the Suez Canal day and night.

Senator HARRIS. The channel can be so marked that there is no difficulty in navigating it at night?

Mr. MENOCAL. No, sir; especially in a country where you have no fogs.

Senator HARRIS. They have no fogs?

Mr. MENOCAL. No, sir; always a clear atmosphere, day and night.

Senator HARRIS. Reverting to the question we touched this morning a little, do you think that the minimum or the greatest curvature which is indicated by the Commission is such as to permit vessels to move around freely without the use of tugs to assist them?

Mr. MENOCAL. I do.

Senator HARRIS. And under their own steam?

Mr. MENOCAL. Yes.

Senator HARRIS. And how is it with sailing vessels through the upper part?

Mr. MENOCAL. They will have to be towed, except across the lake, where they can use sails as there is always a breeze on the lake.

Senator HARRIS. Of course, in the canal in every case.

Mr. MENOCAL. That will be the same in every canal.

The CHAIRMAN. Now, I wanted to ask, with your knowledge of hydraulic engineering, which is great, with regard to the double flight of locks, which is recommended at Bohio, with a maximum lift of 45 feet each; how does that compare with any other lock that you have knowledge of?

Mr. MENOCAL. That is a larger lift than that of any lock that has yet been built.

The CHAIRMAN. There has been no lock built with a lift of 45 feet?

Mr. MENOCAL. No, sir.

The CHAIRMAN. Is not the situation complicated by having a double flight; that is, two locks immediately after one another?

Mr. MENOCAL. Yes; I think the mechanical difficulties of building a lock of a 45-foot lift will be overcome, but when you come to put the two locks together the difficulties are increased.

The CHAIRMAN. That of course aggravates the situation?

Mr. MENOCAL. Yes; very much.

The CHAIRMAN. Do you think this system of double locks is necessary in either canal at present or in the immediate future?

Mr. MENOCAL. It is not necessary; no, sir. You mean two parallel locks?

The CHAIRMAN. Double chambers.

Mr. MENOCAL. Two parallel locks?

The CHAIRMAN. Yes.

Mr. MENOCAL. I do not. I think it is unnecessary.

The CHAIRMAN. As a measure of economy it would be wise to have single locks to start with?

Mr. MENOCAL. Yes.

The CHAIRMAN. And wait for the future to demand a double lock?

Mr. MENOCAL. Yes. That is what I proposed for the Nicaragua Canal. I designed only one series of locks, but always made the location with the view of building another lock at each one of the sites.

The CHAIRMAN. That would be to look forward to?

Mr. MENOCAL. Yes; at any time this lock could be put in. Of course a private company would not undertake to build such a canal as has been designed by the Commission.

The CHAIRMAN. Now, reverting to the two locks, one immediately in connection with the other in flights, as they call them, that is a plan which it is very desirable to avoid everywhere.

Mr. MENOCAL. That is very true; yes, sir.

The CHAIRMAN. That does not occur, I believe, on the Nicaragua line?

Mr. MENOCAL. No, sir.

The CHAIRMAN. They have, first, a lift of 36½ feet.

Mr. MENOCAL. Yes.

The CHAIRMAN. And two of 18½ feet.

Mr. MENOCAL. Yes.

The CHAIRMAN. And then the last one is 36½ feet, and they are all separated from each other by a considerable distance?

Mr. MENOCAL. Yes.

The CHAIRMAN. And by eliminating the double chamber it would reduce the cost of all these locks one-half?

Mr. MENOCAL. Yes.

The CHAIRMAN. Now I will ask you about that harbor at Colon. You say you are familiar with it?

Mr. MENOCAL. I have been in and out of it many times. It is an open roadstead; you might call it so.

The CHAIRMAN. Is it a good safe harbor?

Mr. MENOCAL. It is not.

The CHAIRMAN. Can it be made a good safe harbor?

Mr. MENOCAL. I have been there immediately after one of those

heavy storms, and every wharf in the harbor had been destroyed and two or three sailing ships driven ashore. They, of course, had no means of getting away as the steamers do. The steamers steam out to sea every time one of those northerners come. They always keep up steam while in the harbor. That is a standing rule, but the sailing vessels are helpless.

The CHAIRMAN. Can it be made a good safe harbor?

Mr. MENOCAL. I have no doubt it could. I see the commission estimates about eight million dollars or eight million and a half for the improvement of the harbor.

Senator HARRIS. To provide for an interior harbor which is for safety.

The CHAIRMAN. To cost what?

Senator HARRIS. The estimated cost at this entrance to the harbor is \$8,057,000, of which \$1,966,000 is for one outside jetty only, and the cost of maintenance is estimated at \$30,000. That is simply for the harbor.

The CHAIRMAN. Eight million dollars for the harbor. Now, if you succeed in getting a breakwater at Greytown out at deep water, out at 35 feet, how far would that breakwater have to go at Greytown to get 35 feet?

Mr. MENOCAL. About 3,500 feet.

The CHAIRMAN. Now, if you had a breakwater there well constructed, a proper, good breakwater, with a channel leading into the harbor of Greytown, and that dredged out to the proper depth, how would that compare with Colon as a safe anchorage for ships?

Mr. MENOCAL. Oh, it would be very much safer, as we do not have these northerners at Greytown. We never have any very heavy sea there.

The CHAIRMAN. They strike further down the coast?

Mr. MENOCAL. Yes.

The CHAIRMAN. Then again, I suppose the anchorage in Greytown harbor is good?

Mr. MENOCAL. Oh, very good; heavy sand.

The CHAIRMAN. No rock in the bottom of it?

Mr. MENOCAL. No rock at all; no, sir.

The CHAIRMAN. So that would be a safe harbor?

Mr. MENOCAL. No doubt.

The CHAIRMAN. How would that compare with the harbor at Havre, France?

Mr. MENOCAL. It would be equally safe, but in the case of France and England, they have inland basins, and the ships go into them and are held there while in port.

The CHAIRMAN. How would it compare with the harbor at Port Said?

Mr. MENOCAL. It would be equally as good as Port Said. Port Said is not a very large harbor; it is intended more as an entrance to the canal than a commercial harbor or anchorage.

The CHAIRMAN. Do you know the distance they have to take the breakwater out at Port Said?

Mr. MENOCAL. I do not remember it.

The CHAIRMAN. It is about three times the distance it is at Greytown, but I can not give you the figures. I have got them in my report.

Mr. MENOCAL. It is possible. I have them myself.

Mr. HARRIS. According to the Commission's plan the estimated cost at the entrance of the harbor at Greytown is \$2,198,000, as against the estimated cost in the entrance of the harbor of Colon of—oh, that is \$8,057,000; that will be nearly \$9,000,000.

Mr. MENOCAL. Yes.

The CHAIRMAN. I wish to ask you a question as to the harbor at Brito. You have examined that carefully?

Mr. MENOCAL. Yes.

The CHAIRMAN. How is it proposed in the different canal projects that have been located there to construct that harbor?

Mr. MENOCAL. By building a breakwater from the point that projects into the sea to not a very great distance; that is, an extension of that point would give the necessary protection.

The CHAIRMAN. That is on the northern side of the harbor?

Mr. MENOCAL. Yes.

The CHAIRMAN. Would there be any breakwater on the southern side?

Mr. MENOCAL. It is not necessary. The only reason why a breakwater might be put there is to prevent any possible drifting of the sand from the coast toward the harbor entrance.

The CHAIRMAN. After you get around that breakwater, where do you find a harbor for ships?

Mr. MENOCAL. After you pass this breakwater the harbor would be practically safe.

Senator HARRIS. The Commission recommends more excavation?

Mr. MENOCAL. Oh, yes; it would have to be large. The breakwater is only to protect the entrance to the basin. The inner basin would have to be dredged out in all plans.

The CHAIRMAN. In that enlargement you enter at the mouth of the Rio Grande River?

Mr. MENOCAL. Yes, sir.

The CHAIRMAN. What is the characteristic of the soil of the country at the mouth of the Rio Grande?

Mr. MENOCAL. It is swamp between projecting hills on both sides.

The CHAIRMAN. Then, if I understand you, your harbor would be constructed by the moving of that soil?

Mr. MENOCAL. Yes; that would give us a basin inside which really forms the harbor, as the breakwater outside is merely a protection to the entrance.

The CHAIRMAN. What would be the acreage of that harbor in there?

Mr. MENOCAL. The one I designed contained about, if I remember aright, 400 or 500 acres. I have not seen the plans of the one recommended by the Isthmian Canal Commission.

The CHAIRMAN. It would be about 400 or 500 acres?

Mr. MENOCAL. Yes.

The CHAIRMAN. If it were 400 or 500 acres it would be four times as large as the harbor at Honolulu.

Mr. MENOCAL. Oh, yes; Honolulu is a very small harbor.

The CHAIRMAN. What I wanted to get at is this, whether by dredging and removing the earth out to sea—of course it would go to sea?

Mr. MENOCAL. Not necessarily.

The CHAIRMAN. Out of the mouth of the Rio Grande River—you call it a river, though I suppose it is a very small stream?

Mr. MENOCAL. Yes; a rather small stream.

The CHAIRMAN. Whether you would get a safe and commodious harbor for the ships waiting their turns to get through the canal?

Mr. MENOCAL. Yes; no doubt about it.

The CHAIRMAN. And the canal would be debouched in that bay?

Mr. MENOCAL. And the material need not be taken to sea. It could be dumped into the flat ground in the vicinity, and in that way improve the surroundings.

The CHAIRMAN. I want to ask you now something about another locality there farther in toward the lake called the Tola basin. What is that?

Mr. MENOCAL. That is a basin we had proposed to create by building a dam between two hills at a place called Tola, and by this method I had proposed to create a lake about 5 miles in length and containing about 4,000 acres, superficial area, and which I regard as a very important feature in the design for the canal, because it would make safe anchorage and a very good place for ships to pass each other when going in opposite directions.

The CHAIRMAN. The Isthmian Canal Commission, however, in the plans they adopt, discards the Tola basin.

Mr. MENOCAL. Yes; I had located another line without the basin, and the Commission has selected that one.

The CHAIRMAN. But the basin is there. What I wanted to get at is this: In reference to the future operations of the canal, would that basin be available for any valuable purpose, such as shipbuilding, or repairing, or docking?

Mr. MENOCAL. Well, it might be utilized for that purpose, but as Lake Nicaragua is so near and offers greater facility for building docks and repairing ships, I suppose that such works as those would be built on the lake rather than in the basin.

The CHAIRMAN. Is this basin surrounded by rock or earth?

Mr. MENOCAL. By both.

The CHAIRMAN. You would not consider that the basin was any detriment to the canal because it was there and not utilized at present?

Mr. MENOCAL. The Tola basin?

The CHAIRMAN. Yes.

Mr. MENOCAL. No detriment to the canal. No, sir.

The CHAIRMAN. Might it not be of great use to the canal in the future?

Mr. MENOCAL. It would be of great use to the canal because if anything should happen in that section of the canal between the lake and the basin there is a place that could be used as an inner harbor where the ships could lie at anchor. Ships of war might lie at anchor only $3\frac{1}{2}$ miles from the Pacific; and not only that, but it will give a very large water power which could be made very profitable by selling it for manufacturing purposes.

The CHAIRMAN. That is what I was trying to get at.

Mr. MENOCAL. And also for irrigating the valley back of Brito, which in the dry season is not productive because of the want of water.

The CHAIRMAN. I want to show that the Tola basin would be possibly a very valuable adjunct to the canal in the future.

Mr. MENOCAL. I so regard it.

The CHAIRMAN. How would you get into the Tola basin with a ship—the present line of the canal?

Mr. MENOCAL. The one recommended by the Commission?

The CHAIRMAN. Yes.

Mr. MENOCAL. Why, merely excavate the canal right through the place where the basin was proposed to be built.

The CHAIRMAN. How far would that excavation be?

Mr. MENOCAL. About 5 miles additional excavation.

The CHAIRMAN. A line leading from the present location of the canal to the Tola basin would be only 5 miles?

Mr. MENOCAL. The line as located by ourselves and adopted by the Commission follows this valley where this basin was proposed to be created; it runs through that valley.

The CHAIRMAN. And instead of making the basin there they dredge it out and make a canal?

Mr. MENOCAL. Yes; they excavate instead of having this feature of the basin.

The CHAIRMAN. By putting a dam there you could make a very valuable body of water if you chose to do it.

Mr. MENOCAL. Yes; we would save 5 miles of canal excavation by so doing.

The CHAIRMAN. But that plan has been discarded by the Commission.

Mr. MENOCAL. Yes.

The CHAIRMAN. If that was a better plan you could save five miles' excavation by adopting the Tola basin.

Mr. MENOCAL. Of course, to the basin plan will have to be the cost of building the dam, which is a small amount as compared with the saving in excavation and the facilities for navigating the canal.

The CHAIRMAN. I just wanted to know; I had forgotten the advantages of the Tola basin, and I wanted to get them before the committee. Would the harbor at Brito be entirely safe when it is excavated and that wall built there?

Mr. MENOCAL. There can be no question about it.

The CHAIRMAN. Are there heights on both sides of the mouth of the Rio Grande?

Mr. MENOCAL. Yes.

The CHAIRMAN. To fence off the wind of the Pacific from the harbor?

Mr. MENOCAL. Yes.

The CHAIRMAN. I think that is all I care to ask, and unless you gentlemen have some objection the committee will close the examination of Mr. Menocal and take a recess until to-morrow morning.

Senator KITTREDGE. In order to accommodate Senator Hanna, can not we hear the next witness to-morrow afternoon at 3 o'clock instead of the morning just as well?

The CHAIRMAN. If there is no objection, I think that can be done. I propose further that if Mr. Menocal has any additional statement to make that he may draw it up on a separate paper and submit it to this committee to-morrow. After looking over his testimony he may find something that he wishes to enlarge upon.

Mr. MENOCAL. I may enlarge some of the questions if the committee has no objections.

Senator HARRIS. Yes; if it makes the questions more clear and plain.

Mr. MENOCAL. I will follow the same questions and may enlarge somewhat upon some of the answers.

I would like to call the attention of the committee to two points in

connection with the estimated cost of construction and of operating and maintaining the two canals, which I regard of some importance:

1. The estimated cost of the routes have been based on the same unit prices. To anyone familiar with the conditions existing at Panama and Nicaragua, this will appear to be unfair, for the reason that, apart from the hygienic conditions recognized by all to be far better in Nicaragua, labor must be more abundant and cheaper in the latter country, on account of the unlimited supply of fresh provisions necessary to the comfort of life and preservation of health which can be had there at small cost, while at Panama the laborer has to depend on imported food of all kinds, much to the detriment of his health and physical ability for work. Not less important is the fact that at Nicaragua there is an unlimited supply of timber along the route of the canal, much of which is suitable for numerous temporary and permanent works accessory to the canal, and can be had where needed for the price of handling it. Nothing of the kind can be had at Panama.

2. There is a charge of \$6,886,300 against the Panama Canal as the purchase price of the railroad along that route, and an item of \$7,575,000 in the estimated cost of the Nicaraguan Canal for the projected railroad on that route. The Commission in its report reasserts the well-known fact that Panama is a barren country "on which no considerable development is likely to occur," and none has taken place during the many years it has been the highway of commerce across the Isthmus, except such as has been barely necessary to supply the needs of the traffic by the railroad. But as the interoceanic traffic now carried by the railroad will end with the completion of the canal, and there is no local traffic, the road, if operated at all, must be as an additional charge to the maintenance of the canal. Its cost, therefore, will be a charge against the cost of the canal from which the Government will receive no income after the canal is open to traffic.

On the other hand, the Commission states in the report that "during the construction of a canal on the Nicaragua route business relations will be established with Nicaragua and Costa Rica which would be likely to continue." The country traversed by the canal is very fertile and capable of large development, and the settlement of a large agricultural and industrial population along that region is sure to follow the commencement of work on the canal. The proposed railroad along that route, with branch lines tapping a virgin country rich in natural resources, far from being a charge against the cost of the canal, as in the case of Panama, will be a profitable investment, and its net earning would more than offset the additional estimated cost of maintenance for the Nicaragua route as compared to Panama.

The committee then, at 4.35 o'clock p. m., adjourned until the next day at 3 o'clock p. m.

STATEMENT

OF

LYMAN E. COOLEY

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Monday, February 24, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senator Morgan (chairman).

Also, Senators Kittredge and Millard, members of the committee.

Mr. Lyman E. Cooley appeared and was duly sworn by the chairman.

STATEMENT OF LYMAN E. COOLEY.

The CHAIRMAN. You are a civil engineer?

Mr. COOLEY. Yes.

The CHAIRMAN. How long have you been engaged in that pursuit or vocation?

Mr. COOLEY. Twenty-seven years.

The CHAIRMAN. Where were you educated in that profession?

Mr. COOLEY. In Rensselaer Polytechnic Institute, Troy, N. Y.

The CHAIRMAN. What works of an important character have you had charge of or been connected with as a civil engineer?

Mr. COOLEY. I was connected with the improvement of the Missouri and Mississippi rivers for six years. I have been connected with the Chicago drainage question for sixteen years, and with the improvement of the Illinois River; have been consulting engineer for the State board of health of Illinois for several years; consulting engineer for the city of Chicago on intercepting sewer systems; engineer member of the International Deep Waterway Commission on deep-water navigation from the head of the Great Lakes to the sea; advising engineer of Governor Black's committee of investigation on expenditures on the Erie Canal, under the nine million act; consulting engineer of the Union Water Company, Denver, Colo.; engineer of the Keokuk Water Power Company, Keokuk, Iowa; engineer of the Muskegon River Water Power Company, Michigan; engineer for a group of contractors that went to Panama and Nicaragua in 1897 and 1898, and a number of other minor enterprises.

The CHAIRMAN. As engineer for the contracting company in 1897 and 1898, of which you make mention, did you visit the localities of the Nicaragua and Panama Canal routes?

Mr. COOLEY. We went entirely over the Panama route and examined it in a casual manner. We examined the Nicaragua route with great care on the ground, as much so as we could.

The CHAIRMAN. Was it a private enterprise?

Mr. COOLEY. Yes.

The CHAIRMAN. What were you doing down there? What was your purpose in going there?

Mr. COOLEY. A number of gentlemen in New York were interested in the canal proposition financially, and had undertaken to finance the project of an interoceanic canal in case a group of contractors could put a price upon it. We went down there for the purpose of ascertaining whether we could put a price upon it or not.

The CHAIRMAN. Who went in company with you?

Mr. COOLEY. There was the firm of Mason, Hoge & Co.

The CHAIRMAN. You mean a representative of the firm?

Mr. COOLEY. Represented by Mr. H. P. Mason and Mr. H. B. Hanger, partners in the firm; the firm of E. D. Smith & Co., represented by Mr. J. M. Jackson; the Illinois Dredging Company, represented by Mr. Fred Davis; McArthur Brothers, represented by H. E. Stevens. Christie & Lowe did not have any personal representative, but I represented them by letter. Then there was the firm of Winston Brothers, of Minneapolis, represented by Mr. W. O. Winston; McMullen & Co., of New York, represented by their engineer, Mr. E. A. Little; Washburn & Washburn, of New York, represented by Mr. E. H. Hooker and Mr. F. S. Washburn, jr.; and SooySmith & Co., of New York, represented by myself.

The CHAIRMAN. Did you have any other engineers in your party?

Mr. COOLEY. Among these contractors or contracting representatives they were substantially all engineers, with two or three exceptions. These firms that I speak of are made up of combinations of engineers and business men.

In addition to that, I had as a personal assistant Mr. J. E. Maloney, who had been for several years upon the Chicago Drainage Canal, and is now resident engineer on the Denver dam.

The CHAIRMAN. Is that Denver dam a heavy work?

Mr. COOLEY. It is 225 feet high, with a head of 210 feet of water against it. As to height, or rather the head against it, it is the highest dam in the world, as far as water pressure is concerned. There are dams that are higher from the bottom of the foundations, but none that go higher in the air.

The CHAIRMAN. Was there any commission of the United States making a survey upon the Isthmus at the time you were there?

Mr. COOLEY. The Nicaragua Canal Commission was on the ground on the western division at the time of our visit. Admiral Walker was very kind to us and gave us a letter to all of his assistants in the field, directing them to give us any information that they had at that time.

The CHAIRMAN. Did you take maps and charts with you of former surveys?

Mr. COOLEY. Yes; we had access to all the maps and data of the Maritime Canal Company and of the Nicaragua Canal Board (Ludlow). And, after our return, we put engineers into the office in New York and spent two to three months in studying the information that was of record, in the way of maps, charts, and borings.

The CHAIRMAN. Did you have access to all of Mr. Menocal's surveys?

Mr. COOLEY. Yes.

The CHAIRMAN. And Childs's?

Mr. COOLEY. Yes.

The CHAIRMAN. And Ludlow's?

Mr. COOLEY. Yes.

The CHAIRMAN. And Lull's?

Mr. COOLEY. Yes.

The CHAIRMAN. All of them?

Mr. COOLEY. Yes.

The CHAIRMAN. You made a study of all of them?

Mr. COOLEY. Yes.

The CHAIRMAN. Your purpose down there was, as you have stated, a private purpose. Was it to take a contract for the execution of the work if you came to the conclusion that it was a money-making enterprise, or was it just to assist the Maritime Canal Company in financing its operations?

Mr. COOLEY. The parties who backed this expedition on the financial side had an option on everything that the Maritime Canal Company possessed, and proposed to finance it in case we could reach a conclusion.

Senator KITTREDGE. Who were the parties?

Mr. COOLEY. I am not at liberty to state. It has never been made public, and I would not wish to state it without their permission. We went there with the understanding that if the enterprise appealed to the judgment of this group of men that they would mature a proposition or a figure at which they would agree to build the canal.

Senator KITTREDGE. And buy out the Maritime Canal Company's rights?

Mr. COOLEY. Not so far as that group of men were concerned, but they were to make a proposition to these people who held that relation to the Maritime Company. In case a figure could be made at which responsible parties would undertake to do the work, it was through these people that they would be able to finance the proposition.

Soon after our return from Nicaragua the Spanish war broke out, and that upset the calculations of these gentlemen, and the canal problem very soon took on the shape of a Government enterprise, and the matter was finally dropped.

It was pursued, however, by myself and some of my colleagues until Congress passed the million-dollar bill, which seemed to postpone the matter indefinitely, and then we dropped it. We had thought up to that time, in view of the time and labor we had put on it, that perhaps we would make a proposition to the Government in some form to build the canal for cash, on a limit of time; and to that end, and partially in the pursuit of the original purpose, I spent something over a year with a force of men in making up contractors' designs and estimates. It was proposed to make our own plans and estimates on which we were willing to undertake the work.

Senator KITTREDGE. Did the gentlemen whom you were representing have knowledge of your work?

Mr. COOLEY. They kept in touch with the matter until December, 1898, when Congress had taken the matter up, and it became apparent that the matter would become a Government enterprise. Then it was followed no further, and there never was a final meeting on the matter to approve a set of estimates.

Senator KITTREDGE. But you worked after that time?

Mr. COOLEY. I worked for a couple of months after that time in closing up the matter in such form as I could preserve it and store it away in the vaults.

The CHAIRMAN. Did your party make a thorough examination of the Nicaragua route?

Mr. COOLEY. We thought we saw everything that was material that could be seen on the ground.

Senator KITTREDGE. How long were you there?

Mr. COOLEY. We were there in Nicaragua about four weeks. We spent eighteen days on the line, actually out in the field. We were four or five days on the Pacific side on horseback. It is only 18 miles from the shore of the lake to the sea, and it was possible in that time to see everything that could be seen, in detail.

We spent three or four days on the lake and river in steamboats, rowboats, and otherwise, making a superficial examination, such as we could without going into actual surveying. The party divided at Ochoa. The majority of the party took the overland trip along the Menocal line to Greytown. That took six days, walking through swamps, and over hills and through the chaparral.

Part of the party went over what is known as the Tamber Grande ridge line. We sent two men over that line to see if it was feasible for a dam site and embankment line in lieu of Ochoa, and some of the older gentlemen of the party, who did not feel like undergoing the fatigue of the overland trip, went around by the river route and the low-level country to Greytown.

We spent two or three days in examining around Greytown. I think that we saw virtually everything that could be seen in an examination of that character.

I will say, however, that the thought of our party, the practical contracting end of it, was not so much directed to the details of what they saw on the ground as it was to broad questions of inquiry in regard to the resources available for construction, the labor conditions, and the climatic and health conditions, and what would be necessary in the way of transportation facilities. Those are questions which involve larger contingencies than any mere variation of quantities. They assumed that the quantities, of course, would be taken from the profiles. When it became necessary to construct the canal, it would have to be divided up into working sections, each of which must be self-contained and homogeneous, and then it would have to be studied with great detail on the ground, as to where the yards of material were to come from and where they were to go to. That would be a labor of weeks and months, after there was a specific detailed plan to work to.

The results of our investigations, however, were to make it clear to us from the contractor's standpoint that there was no complete plan extant at that time upon which we were willing to make figures.

When you come to study plans in detail, as I had occasion to do for this group of gentlemen, and see how you are actually going to do the work, how you have to install for it and what disposition you have to make of the material, then you begin to change, in order to facilitate construction——

Senator KITTREDGE. You mean change the plans?

Mr. COOLEY. Yes.

Senator KITTREDGE. Change the route?

Mr. COOLEY. Change it in many cases, yes; and when you have completed that part of the study you will have a family likeness to your original project, but not the original project in detail.

And that, possibly, is a criticism to be made against all investigations and plans that have been made—that there has not been enough of the

constructing element, if I may say so, in the consideration of the matter. They have projected canals that no doubt were entirely good and proper for the purposes of a canal, but not easy to construct.

Senator KITTREDGE. Did you have the plans of the Walker Commission?

Mr. COOLEY. The plans of the Walker Commission were not at that time matured.

Senator KITTREDGE. Have you examined those plans?

Mr. COOLEY. Yes; I have read that report in full, and I know all the members of that Commission.

The CHAIRMAN. The report of the Walker Commission was made on the 9th of May, 1899?

Mr. COOLEY. Yes.

Senator KITTREDGE. You have read that report?

Mr. COOLEY. Yes; and examined all the plates.

Senator KITTREDGE. And your statement in regard to the difficulties of construction, etc., which you have just mentioned, apply to those plans as well as the prior plans?

Mr. COOLEY. Yes; they apply to any plans that I am familiar with. They apply to the last plans. I have examined the last report so far as published.

Senator KITTREDGE. And to all plans on the Nicaragua route?

Mr. COOLEY. Yes; very large liberty should be allowed to the people who are to construct this canal, in my judgment; very large liberty to the men who are to be responsible for the final designs.

The CHAIRMAN. Is this large liberty necessary for the purpose of locating a canal that is to be permanent and useful for the purposes for which it is designed, and is it a question of a better choice of routes?

Mr. COOLEY. It is needed both for the best design for the uses to which the canal is to be put and for construction purposes, in my judgment.

The CHAIRMAN. And for construction purposes?

Mr. COOLEY. Both.

The CHAIRMAN. Does it imply that there are plans designed by any of these previous engineers, Childs, Lull, Menocal, and the Walker Commission, which are impracticable?

Mr. COOLEY. No, sir; there are none of them that are impracticable.

The CHAIRMAN. Does it mean, then, cost and convenience in location?

Mr. COOLEY. Yes.

Senator KITTREDGE. Indicate, if you please, in a general way, the character of the changes in the routes taken.

Mr. COOLEY. Well, I would say that probably among all engineers since the days of Childs, so far as the western division is concerned, it would be a matter of detailed judgment. There is not enough difference in that matter to make an issue, as to whether it is high level or low level, or some other variation.

Senator KITTREDGE. Do the changes contemplated by you make the route straighter; that is, with less curvature?

Mr. COOLEY. They improve it greatly. I will add, in further answer to your first question, that so far as the middle division is concerned, that is a question of improving a river and the shallows of the lake, and is a mere matter of judgment as to how much money you want to spend, as to how effective you make that division. You can shorten it. You can spend more money or less money on it.

Senator MILLARD. You are speaking of the Nicaragua route now?

Mr. COOLEY. Yes.

Senator MILLARD. And that is the lake part?

Mr. COOLEY. It is between the lake and the Rio San Carlos. The eastern division, I think, is where the differences would come in.

Senator KITTREDGE. That is, from Greytown to what point?

Mr. COOLEY. From Greytown to Conchuda, we will say.

The CHAIRMAN. To the dam, wherever it is.

Mr. COOLEY. Yes. We will speak of Conchuda as a division point, because all plans have been substantially the same since the days of Childs from Conchuda, or some point above, westward to the Pacific. From Conchuda to the Atlantic there have been two conceptions only the one of Mr. Menocal and the original conception of Mr. Childs.

The original conception of Mr. Childs was a slack-water proposition for a moderate depth of water, and such as the art of engineering at that time justified, and such as you would build to-day for a moderate depth of water.

The conception of Mr. Menocal was to extend the level of lake Nicaragua to the utmost possible distance toward the eastern seaboard and then drop to the sea in the shortest possible distance. Every commission since Menocal's project was made has paid tribute to that conception to the extent that they thought it feasible.

The Ludlow Commission thought there was great danger and unwarranted risk in the construction of the extensive embankments which Mr. Menocal had projected and in the Ochoa dam.

The Walker Commission apparently accepted that idea, after making an investigation of Tambor Grande, and determining that a dam site did not exist at that point. So they projected a dam site at Boca San Carlos, and went down to the sea by a canal something like 46 miles long, if I recall.

This last commission has adopted the idea of a canal from Conchuda, a point some 4 miles above San Carlos.

All these conceptions, of the Ludlow Commission, the Walker Commission, and the Isthmian Commission, have turned on the presumption that a masonry dam was the only safe structure to build, and that they must find a site in which to build it, and so they have progressively shoved the point up stream until they could find a rock site, first at Ochoa, later at Boca San Carlos, and later still at Conchuda.

Senator KITTREDGE. Do you approve of that plan?

Mr. COOLEY. I have not been able, am not now, and never have been, to tolerate the idea of a masonry dam in that country——

Senator KITTREDGE. What sort of a dam do you think should be constructed?

Mr. COOLEY. Because it is an earthquake country, and whereas I do not regard that danger as imminent, it is one to which the benefit of the doubt should be given, and I should regard a masonry dam as an extremely doubtful structure to build, under all the conditions. You can build a ridge of ground, a mound of earth and rock, and provide spillways in proper sites for them, which will be entirely safe against all possible disruption by earthquake, and can build that without the necessity of going to rock or needing foundations of that character.

Senator KITTREDGE. How deep would you go for the foundations of a dam of that character?

Mr. COOLEY. It would not be necessary to go to any considerable depth farther than you could dredge, and drive sheet piling under the base, and make a very wide base, and use all the surplus material from excavation that you had for the purpose. In that way you make a natural hill, virtually, through which the plane of saturation is at so slight an angle that there is no danger of moving any of the material, and you can make it tight, if you choose, by dredging mud and silt and placing same in front of it, or you can core it if you choose.

Senator KITTREDGE. How deep would you place that core?

Mr. COOLEY. The deeper the better. There is no absolute necessity of going to rock. That makes no difference. You can make a dam of wind-blown sand, if you make it broad enough, so as to reduce the seepage plane of the water through it to a point where it will not disturb any of the material. The core is only insurance and a concession to doubts, and will diminish the breadth of base needed.

Senator MILLARD. There is no danger of a dam of that kind being undermined, is there?

Mr. COOLEY. No, sir; I have just finished a report on a dam for the Muskegon River, located in a glacial overwash of coarse gravel, and the whole principle involved in the thing is as old as the history of engineering. We put the foundations down pretty well, as we have to. We drive sheet piling beneath it as far as we reasonably can, support it by bearing piles, and then we seal the river bed upstream as far as we think necessary.

Senator KITTREDGE. How is that done?

Mr. COOLEY. Just by excavating the sand and gravel strata, and filling back with water-tight material, so as to extend the length of the seepage lines. You can reduce the amount of seepage in that way to less than any assignable quantity, and give it any degree of insurance that you please.

The CHAIRMAN. Is that what you call "puddling" in engineering?

Mr. COOLEY. Yes; puddling, except that we do not take the care in regard to it that we would in making a puddle core.

Now, there is a remarkable example of a structure built upon that plan, which has attracted too little attention in the world, and that is the barrage and bridge across the head of the Nile Delta, the Damietta and Rosetta mouths, built in the days of Ismail Pasha by a French engineer. For lack of resources and other causes he did not complete it properly, and it was not put into use until within the last few years, under Lord Cromer, the English administrator. There is a foundation as bad as the delta of the Mississippi, a compressible soil, extremely fine. They have built an extraordinary structure of masonry architecture, such as I would not have the nerve to do, which is monumental in its character. It is built across these streams, founded on a concrete base, in some places laid on riprap dumps, and then the bed of the river is simply sealed for a distance of 300 feet with water-tight material—clay. This dam raises the water 14 feet on that kind of soil, and it has been a perfect success for several years.

Senator KITTREDGE. How wide would this dam suggested by you be at its base?

Mr. COOLEY. A quarter of a mile. You can form your own judgment, from what you know of seepage water, as to whether 50 to 70 feet of water against that would be liable to seep to any great extent.

The CHAIRMAN. Is such a dam as you have described practicable in the San Juan River.

Mr. COOLEY. Yes; practicable anywhere on earth.

The CHAIRMAN. Above or below the mouth of the San Carlos?

Mr. COOLEY. Anywhere; but particularly invited where you can divert the stream through some by-pass, prepared in advance.

The CHAIRMAN. Starting at Tambercito?

Mr. COOLEY. The particular point which attracted our attention, and which seemed to me to be the key to the whole situation, was the ability to construct a dam at Tambor Grande, or in that vicinity. If that can be done, you can extend the level of Lake Nicaragua immediately to the foot of the eastern divide, cut that divide, and drop down to sea level in a distance of about 7 miles, and then it is simply a question of dredging out to sea. Now, I will tell you, although I did not intend to do so——

The CHAIRMAN. About what was the distance from Tambor Grande to Greytown Harbor?

Mr. COOLEY. It must be 20 miles or so.

The CHAIRMAN. Twenty miles from Greytown?

Mr. COOLEY. Yes.

The CHAIRMAN. So that in the case of the dam you speak of erected at Tambor Grande that would leave only about 20 miles of canal between there and Greytown?

Mr. COOLEY. As a matter of fact, from the backwater produced in the Limpio Valley, a stream which runs off from the divide, from ship navigation in this pool thus created to the shore line at Greytown would be some 17 miles.

The CHAIRMAN. Then there is a divide there that crosses the San Juan at or about Tambor Grande?

Mr. COOLEY. There is a line of hills going southwesterly from Tambor Grande, with many gaps in them. The most of those gaps are in a distance of 5 or 6 miles. There are a few extending out for 10 or 12. The extent of these gaps, I think, is less than a third of the mileage of the original Menocal project.

It is but due to Mr. Menocal to say that a dam in this vicinity was his original conception, as he told me, at Rivas; and his assistant, Mr. Perez, who accompanied our party on the eastern division, informed me that they hunted for a dam site in that locality, but had been unable to find one. They had missed it on both sides.

Now, in this ridge line of which I speak, the gaps are reduced to something about a third of what exists on the original Menocal project. They are comparatively close to the divide cut where you have a great many million yards of excavation to dispose of; and so it can be routed right to the site for merely the extra haul; because in that cutting you have got to load everything onto cars anyway, and it is merely the extra haul, and the care of placing enough material to fill that entire gap across there with a ridge line at least 500 feet wide on the top, and with a very flat slope. And if there is any apprehension about percolation, it is perfectly feasible to go in with a hydraulic dredge and pump any amount of material up against the face of it and thus seal the face.

The CHAIRMAN. I do not think I exactly comprehend the geography there. Do you mean that that ridge line at Tambercito or in that vicinity crosses the San Juan River, or that the San Juan River runs through a depression of it?

Mr. COOLEY. There is a hill right opposite Tambor Grande, a hill 900 feet away, and the river passes through that gap.

The CHAIRMAN. That is what I wanted to get at. Then there is a hill or a series of hills running along there?

Mr. COOLEY. There is a series of hills running along for a distance, and then a swamp about 1,900 feet across, with 30 feet of mud in it. Then there is a series of sawteeth, or hills and saddles, for several miles.

The CHAIRMAN. I want to ask you a question about that. It would seem from your statement that your preference in the location of a dam there would be for a dam at Tambor Grande?

Mr. COOLEY. Yes.

The CHAIRMAN. And the canal from that point to Greytown would be 17 miles long, you say?

Mr. COOLEY. Well, there are bona fide reasons for that preference.

The CHAIRMAN. I just wanted to get a statement of whether that was your opinion.

Mr. COOLEY. Yes. I think a dam constructed in that manner is safer, more conservative, than the constructions proposed. Mr. Morison, in fact, has adopted virtually the same principle in the expression of his individual views in regard to the Bohio dam at Panama.

Senator KITTREDGE. Is that the same sort of a dam as what you propose to construct at Tambor Grande?

Mr. COOLEY. Virtually. He discusses it at length in the proceedings of the American Society of Civil Engineers for January.

The CHAIRMAN. Mr. Morison, however, does not provide for puddling on the upper face of the dam, does he?

Mr. COOLEY. No, sir; the estimates I made were based upon that conception, which reduced the heavy work to a distance of about 7 miles. From there it was 10 miles of sea-level work or dredging. The 7 miles cover the locks and the divide cutting.

The CHAIRMAN. When you say it reduces it 7 miles, you mean as compared with the Menocal cut?

Mr. COOLEY. It was virtually the same length of cutting as the Menocal cutting.

The CHAIRMAN. But as compared with the Conchuda project it would be a great many more miles than 7, would it not?

Mr. COOLEY. I do not speak of the amount of reduction. I was not speaking about the length of canal. I was speaking about the heavy work. The actual construction work was virtually concentrated in a length of 7 miles, except that portion at sea level, which is dredging or machine work.

The conditions on the eastern division are so intense, in the way of rainfall, that it seemed from a construction standpoint to be a mistaken policy to distribute that work over 40 or 50 miles of distance, over swamps and through all sorts of situations; that you would be taking undue risks as to health and other things, and multiplying contingencies without number; that if you could concentrate this work in a short distance it would be a great advantage to do so, because then you could provide sanitary arrangements and concentrate your men, and treat your whole enterprise virtually as a manufacturing proposition that you were going to sit down and lay out and do during, we will say, eight years' time; and that, from the construction standpoint, is the proper way to treat the eastern division.

You should operate directly the opposite to what you would in the United States or on the western division, where you would distribute

your work; but on the eastern division it is not a safe or wise proposition.

Senator KITTREDGE. A few moments ago you were going to make a suggestion which was interrupted by some question.

Mr. COOLEY. Well, that was in regard to the real construction reasons that determined our choice of the plan of concentrating the work, as against the plan of distributing the work, under these climatic conditions.

Senator KITTREDGE. Then your opinion is that where the work is concentrated it is far better than to have it scattered along?

Mr. COOLEY. Under the climatic conditions that obtain on the eastern division, yes; under the climatic conditions that obtain on the western division or in the United States, no.

The CHAIRMAN. I will ask you whether the estimates you made for this party of constructors, upon which they were expected to base financial responsibilities, were based upon the location of the dam at Tambor Grando, at Ochoa, or at Boca San Carlos.

Mr. COOLEY. They were based upon the proposition as I have outlined it—an extension of the level of lake Nicaragua to the eastern divide by the construction of a dam at Tamber Grande, on the Tamber Grande ridge line, the cutting through of that divide and the locking down to sea level in a distance of about 7 miles, and then the dredging out to sea. So that if you consider your sea-level portion as an extension of your harbor, the real beginning of your canal would be at the locks, and its length to this artificial lake would be 7 miles only.

The CHAIRMAN. Did your party of contractors and engineers come to a conclusion as to what you would be willing to undertake that work for—building a canal through there?

Mr. COOLEY. As I said at the outset, there was no final conference in regard to that matter. I did send out schedules, and I got returns and advice from several of the contractors, and on that I made up some final figures which I expected to submit and have submitted to part of them; but as the matter was practically disposed of before we got to that, I can not say that they have been properly verified by that group of men. I have every confidence, however, that they would verify them, barring this, that since that time the cost of work has increased to a very considerable percentage; that contractors who accept work on prices made in 1898, where the work has continued for two or three years, have generally lost money on a rising market. The figures made then might have to be raised if present conditions are to continue indefinitely.

The CHAIRMAN. You mean on the price of labor?

Mr. COOLEY. Everything is going up; material is delayed, and you could not get an installation to do such a work at Nicaragua now within any ordinary limit of time. I do not know how long a time you would have to wait. You would have to order away ahead.

The CHAIRMAN. Have you any objection to stating what conclusion you arrived at, to advise your clients, as to what sum of money you would be willing to undertake to complete that canal for, on a plan as broad and in every respect as complete as the plan suggested by the Isthmian Canal Commission?

Mr. COOLEY. I hope you will bear with me a little. The plan that I finally estimated on was a plan for a canal 180 feet wide.

The CHAIRMAN. One hundred and eighty feet?

Mr. COOLEY. Yes; which is very much wider—30 feet wider—than the present project; and of that width of canal, in the whole route, there was less than 12 miles, as I recall, from sea level to sea level, at foot of locks at either end. Everything else was wider. The river division we did not treat as thoroughly as the canal divisions, because that was regarded as a work subject to betterment in the future. I think our dimensions were 220 feet wide on the bottom and 320 feet at bends, and 270 feet in Lake Nicaragua, if I remember right.

We made our canal for 36 feet of water, or 4 feet below the level of the miter sills, which were to be 32 feet. I believed that in these great rock cuts the bottom of the canal ought to be some feet below the level of the miter sills.

The locks were to be 80 feet by 700. I do not now recall the dimensions of the last proposition. I think they are a little wider, and about the same length. [84 by 740 feet.]

The river division was made 32 feet deep, with the idea of deepening in the future.

The work as a whole provided a better canal than is now estimated, through which a 10-knot vessel could pass in probably 24 to 26 hours, in place of 33, as estimated now.

I will say without hesitation that the estimates submitted by the last Commission are sufficient to cover such a canal, and I believe that if the Government wishes to entertain a proposition to build it, from a syndicate of men, that people could be had who will agree to do it and will give sufficient bond.

The CHAIRMAN. Have you any objection to stating the aggregate amount of your estimate?

Mr. COOLEY. Yes; I do not think I should do that. That is private property.

The CHAIRMAN. I do not want to call for private property.

Mr. COOLEY. It has cost me a great deal of labor and time,

The CHAIRMAN. Was it greater or less than the estimate of the Isthmian Canal Commission?

Mr. COOLEY. Less.

The CHAIRMAN. Much less?

Mr. COOLEY. There were several different plans that we estimated on, and many variations. I went over it pretty exhaustively. When I say less, I mean this: There is not presented in the report of the Commission a table of quantities, or any statement by which a professional man can judge how they have applied their unit prices, or make a comparison as to whether their estimates are really higher or lower than the ones which I made. We went at it in a very different manner, laid out a time schedule as to the order in which work must be done. To provide transportation and access, river diversions and other things are antecedent to the dividing of work up into contracts for individual lettings. There is a certain amount of the estimate involved in that.

There is a certain other line of propositions, like the providing of hospital and police service, the providing of water supply, administration, shops, and things of that kind, which were also the subject of a separate estimate; and we really did not apply unit prices until we came down to the point where we could divide the work into sections. And in applying those, they vary with the circumstances and the conditions of haul in each section. So there is not any real means of comparison except in the aggregate.

I will say this, however, as a result of the estimates I made for this canal, with the different variations, and a great number of different estimates that I made for the canal at Chicago, on different plans of treatment, that you can take any great work and make a flat estimate, and then take different plans that presume to accomplish the same result, and they will not vary by a large percentage. They will all be within moderate limits. So you can take one estimate, almost, for any plan that you may devise that accomplishes the same result; that is, I speak of the flat estimates. There will be some plans on which you can construct more easily and cheaply than on others.

Senator MILLARD. Do I understand that in dollars your estimate would be below the estimate that has been submitted here?

Mr. COOLEY. Yes.

Senator MILLARD. And your plan contemplated a wider canal?

Mr. COOLEY. Yes.

Senator MILLARD. And you contemplate double locks?

Mr. COOLEY. Yes. It would be, I think, a safe statement to say that under the present conditions of the market, as to materials and labor, that a canal can be built of the dimensions and on the plan that I speak of for the aggregate Commission estimate. In speaking of estimates, however, I wish to be distinctly understood. They are valid only for a syndicate that undertakes the entire enterprise. I can not undertake to discount the cost under other conditions of design, management, and construction.

Senator KITTREDGE. Did your plans include the construction of harbors?

Mr. COOLEY. Yes.

Senator KITTREDGE. Substantially arranged as by the Walker Commission?

Mr. COOLEY. As far as the western division is concerned the variation is very slight in any of the plans. The treatment of the Greytown end was a different proposition from any that had been offered, I think—a different conception—and, in my judgment, more effective. It inclosed quite a large area.

If you will recall, at Greytown you are in a bight, with a main littoral drift coming northward and producing a hook. Every few generations it produces a new hook and a new lagoon. Then, the local conditions are such that there is a drift to the southward, and you are in a reentering angle that tends to fill up; so that the proper principle of construction at Greytown is to build two breakwaters, one of which catches the drift from the south and the other from the north, and thus inclose the reentering angle for a harbor.

Senator MILLARD. Did you give attention also to the Panama route as well as to Nicaragua?

Mr. COOLEY. We did not intend to do so. We never made up any estimates, except of a fugitive character, as to Panama. We did examine it very carefully, as a large work under the labor conditions existing in the Tropics, and our people inquired into that very diligently, as to all the conditions existing there, the class of labor that they had, the market for it, and in regard to the character of the material to be excavated. In fact, they really devoted more attention to those matters than they did to the canal line itself.

We went over every public work that could be reached. We made a special trip along a new railroad that was being constructed in Nica-

ragua, and made a special trip into Costa Rica to examine a railway being built there by American contractors, in order to determine these labor questions and the resources of the country, the soil conditions, and so on, which are a part of the business propositions governing an enterprise of this kind.

At I stated at the outset, a variation of quantities involves less contingency than any one of the elements of health, transportation, resources, and labor market.

When you have installed for a work, the question whether you have an increase in quantities is very much like a question of a few more tons of freight for a railway to carry, after it has all the equipment and facilities to do it with. The extra work is done more cheaply, so that variation does not cut so great a figure.

Senator KITTREDGE. Did your plans include the construction of a railroad?

Mr. COOLEY. Whatever was necessary for construction purposes. The first and important thing to do, of course, is to get a line of transportation across.

Senator KITTREDGE. Did that contemplate the construction of a railroad?

Mr. COOLEY. Part of the way.

Senator KITTREDGE. And part of the way by river?

Mr. COOLEY. Part of the way it contemplated using the river and the lake.

We have an economic paradox on Lake Michigan, by which a man with 100 miles of railroad up in the Northern Peninsula of Michigan loads his cars on to a flat and brings them down to South Chicago, 300 miles, with a tug, and does it right along, in competition with railroads.

And so the question of getting cheap transportation, considering all the conditions that you have across there, is a question of combining certain short railroad stretches with the use of the water, and car boats. That would be the quick way. You may improve that eventually and make a land transportation line clear across.

The CHAIRMAN. With a view to getting at your conclusions or opinions on the two routes compared, I will ask you to state in your own way what you did and what you saw at Panama?

Mr. COOLEY. We spent the greater part of a day at Colon, inspecting the canal entrance; went up the canal for several miles, saw everything that was there in the course of a few hours. The next morning we took the 6 o'clock train and went over to Panama, took breakfast, and came back with the director-general and other officials of the Panama Company, to the beginning of the Culebra cut.

Our party walked pretty much the whole length of the Culebra cut and took one or two intermediate railway journeys down as far as Matachin, before 6 o'clock that evening, a feat of enterprise which very much startled the natives of that region and the officials.

There was no man in the party who was not in the habit of sizing up this kind of a situation very quickly, and we felt as if we had seen everything of moment to us, as much as if we had stayed there a week.

The next day we took a tug and went down to Boca del Terro and inspected the Rio Grande on sea-level division. We went up the canal for some distance, inspected the landing stage being erected at Boca del Terro, and the 3-mile under-water cut that they were excavating out to the anchorage. With two or three of our party I

spent a part of that day with the Director-General in examining the plans and the reports of the technical Commission; also a part of the next day.

Then we took the steamer San Blas and went up to Nicaragua. The Panama part of our trip was incidental rather than premeditated, but we were given every attention and every facility to see all that was material to us.

After I returned I had several conferences with Mr. R. G. Ward, who was roadmaster of the Panama road for eight years, and familiar with all the operations that had been going on at Panama.

The CHAIRMAN. Where is he now?

Mr. COOLEY. He is superintendent of construction of the Van Horne Syndicate in eastern Cuba. He filled in all the gaps in my information.

I had some conferences with agents of the Panama Company in New York. The gentleman who made the surveys at Panama for the last Commission was an old assistant of mine, Mr. Charles L. Harrison, who is now the chief engineer of the Denver Union Water Company, on my recommendation, and I am familiar with his investigations and have seen his maps; in fact, before he turned in his work to the Commission. I was then and am now the consulting engineer of the Denver Water Company. So I feel reasonably familiar with the Panama enterprise; in fact, I do not see anything that has developed in connection with these last recommendations that was not anticipated, at least as far as I am concerned.

The Panama route is feasible. There is no question about that. You can build a canal there. What it will cost, no man knows. On a flat estimate the two projects are about a stand-off apparently, with the balance in favor of Panama on the question of maintenance and operation; but I feel very certain that you will have to discount the flat estimate very largely when you come to construct the Panama route, when contractors come to put figures on it, on account of the bad odor in which the enterprise has been for so many years, which raises an element of doubt in the public mind and in the financial world where contractors have to get their backing; and this element of doubt would affect the minds of many men. I know it would affect the minds of some of the people that went down to that country with me.

As to the question of their individual health and safety, these men have reached mature age. They can do work in the United States, they have made their competence, and they do not care to take risks where it is not necessary to do so.

And there is another element of doubt also as to whether the Frenchmen have not been up against a real problem as to whether it really was all steal and all incompetence, and whether Americans are at least twice as honest and twice as competent, or three times as honest and three times as competent, or somewhere in that ratio. It depends on where you draw the line as to honesty and competence between Americans and Frenchmen.

If in the aggregate an American in honesty and competency be worth six Frenchmen, then the last estimate stands. If he is only worth four, you have got to add 50 per cent.

There is an atmosphere about the whole thing which is disheartening when you try to work it out from a strictly business standpoint

with a view to the actual building of the canal. I say that, without prejudice I hope, because I went down there without determined conviction and came back with a predilection for the Panama route that stayed by me for some months. It is so open down there, you can see things so plainly, you can see so clearly how you can divide the work up into sections and set contractors to work, that it produces a very strong impression on you at first, and I say that impression stayed with me for a long time, and until I had worked out in my mind clearly the preliminary programme by which the Nicaragua route should be put into a condition also to subdivide into contracts.

You are in a wilderness in much of Nicaragua. It is not easy to see things. The physical discomfort in getting around is simply enormous on the eastern division. Fortunately I had the good sense, I congratulate myself on that, to select men who were pioneer men, who had been doing pioneer work, not municipal contractors, but men who had been out against the frontier, and engineers of the same class, who would not be deterred by an unbroken wilderness. And one of these men remarked, in a very significant way, that if the country was cleared up, if there were roads where men could ride about with a buggy and get around comfortably, and if there were good hotels at convenient intervals, it would make every difference in the world in a man's mental attitude. You may look for the average man who undertakes to examine these routes to be in favor of Panama for that reason. I did not discover anything in Nicaragua that was equal to an Arkansas canebrake in the St. Francis bottoms. I did not discover anything in the way of a forest that was equal to a Wisconsin forest. I did not discover anything in the way of insects that was equal to experiences I have had on the Missouri River bottoms in the State of Nebraska.

We looked particularly into the health conditions, and I am just as confident of the health conditions in Nicaragua as I am along the Gulf coast of the United States; and I am not as confident of the health conditions at Panama.

I believe that those conditions, the mere difference on that one thing of comparative health alone, will make the difference between a profit and a loss to a syndicate that undertakes to build these works. I believe, further, that if you will take the \$40,000,000 with which it is proposed to buy the situation at Panama, and spend that sum judiciously in Nicaragua, and then recall this same Commission, there will not be a question of doubt as to the superiority of the Nicaragua route in the mind of any man who has signed this last report. That is my best judgment, and I am very firm in that conclusion.

The CHAIRMAN. Did the harbor at Colon impress you as a safe harbor, or an accessible one?

Mr. COOLEY. There are no harbors on the Panama route, any more than there are at Nicaragua. The harbor of Colon is absolutely untenable under any onshore wind. When we reached Colon every ship had been to sea for four days, and only reached port on the heels of the same storm in which we went down the Atlantic.

On the Panama side there has never been a harbor. There has been lighterage out to the anchorage some 3 miles from shore ever since there was a transit across the Isthmus. It is true there is an anchorage there, and that there is ample protection behind the islands in Panama Bay. They have developed this underwater cut of some 3

miles in length, to Boca del Terro, or to the landing stage, in connection with the Panama Railroad. That is only since 1899, I think.

At Greytown you have nothing. At Brito of course you have nothing. Four miles from Brito you have a small working harbor, San Juan del Sur, that will hold a few vessels, which gives you a temporary base on the Pacific.

The CHAIRMAN. Is San Juan del Sur a safe harbor?

Mr. COOLEY. Yes.

The CHAIRMAN. Deep water?

Mr. COOLEY. Oh, yes.

The CHAIRMAN. Four miles away from Brito?

Mr. COOLEY. Yes.

The CHAIRMAN. To get to it you have got to sail up the coast and come into Brito?

Mr. COOLEY. It is one of those little bottle-shaped harbors, just big enough for a steamer to get into and turn around. All the Pacific mail steamers run in there and land their mails for Nicaragua. It is the old port used by Vanderbilt in the Nicaragua transit. With a mere spur of a railroad running down there from Brito you can use it temporarily, until you can open up your works at Brito, so that problem solves itself.

There is absolutely no access at Greytown until you make it, except lighterage without shelter, but you can run out a pier for a couple of thousand feet, and do some dredging alongside, involving a moderate amount of work, and then you can get vessels in there drawing 12 and 15 feet of water; and when you have this foothold, you can do anything.

The conditions are most excellent on both shores for producing good harbors, and especially on the Pacific shore for producing a harbor that is much superior to anything that can be produced at Panama. I think possibly they can produce one at Colon as good as at Greytown; but as proposed now the harbor in either case is in the mouth of the canal, simply an enlargement of a canal section.

The CHAIRMAN. At what season of the year were you at Colon?

Mr. COOLEY. About the holidays, about the 1st of January. I do not remember the exact date.

The CHAIRMAN. What was the state of the weather while you were there?

Mr. COOLEY. The weather was very fair. We went down in a norther which was reported to be the most severe that had struck that coast for twenty years.

The CHAIRMAN. You went down in a norther?

Mr. COOLEY. Yes.

The CHAIRMAN. What effect did that norther have on the shipping in the bay of Colon?

Mr. COOLEY. They had all been to sea for four days before we got there and just got back that morning.

The CHAIRMAN. Had been to sea for four days?

Mr. COOLEY. Yes.

The CHAIRMAN. Everything in the harbor?

Mr. COOLEY. Everything cleared out.

The CHAIRMAN. How can a sailing ship get out of there when a norther is coming down?

Mr. COOLEY. There is a sort of a ground swell that gives a warning

of three or four hours, I think, and I suppose a wise sea captain possibly could anticipate it sufficiently to get out.

The CHAIRMAN. Then, if I understand, you would not say that is a safe harbor?

Mr. COOLEY. It is not a safe harbor under present conditions, except as you make it so.

The CHAIRMAN. It can be made a safe harbor?

Mr. COOLEY. Oh, yes; I think so.

The CHAIRMAN. Did it occur to you to examine whether it was necessary to make a breakwater or pier to fence off the waves produced by these northerers?

Mr. COOLEY. Why, there is no refuge against a norther. There is no place where boats can moor or will be able to moor, except as it is produced in the mouth of this canal. I think it would be feasible—I judge so from inspecting the admiralty chart of Limon Bay—to run out a breakwater from the point opposite Colon and inclose an area of deep water sufficient for refuge.

The CHAIRMAN. Would you consider that a necessary precaution against the invasion of these northerers and the waves they bring?

Mr. COOLEY. That would not really protect the mouth of the canal. It occurred to me, in looking over the admiralty chart and the maps, to inquire why they did not make their project on the basis of putting a breakwater there that would give them an anchorage ground, and in place of starting the canal at Colon starting it from the head of Limon Bay, farther inland. There may have been some reason that I did not know about for the preference, but that seemed to me to be the better.

The CHAIRMAN. The head of Limon Bay is several miles inland, is it not?

Mr. COOLEY. I do not recall how far, but it is 2 or 3 miles at least, and of course the head of that bay is shallow; but that would not be material. As long as you had the protection of a breakwater you could dredge through the shoal water.

The CHAIRMAN. I believe you said that on the Panama side you went up to Boca del Terro?

Mr. COOLEY. Yes.

The CHAIRMAN. Is that the mouth of the river?

Mr. COOLEY. Yes; the Rio Grande.

The CHAIRMAN. They call everything a river down there. Is it any considerable stream?

Mr. COOLEY. No; it drains only a few square miles.

The CHAIRMAN. How far up did you go?

Mr. COOLEY. We went up some distance. We did not go clear up to Lafflores, I think it is, where they propose to make a tide lock. We went up some distance in a launch. We did not make any soundings to know whether it was generally shallow, but there is a good deal of silt in it that has been washed in.

The CHAIRMAN. Was the water shallow?

Mr. COOLEY. Yes; in places.

The CHAIRMAN. Two or 3 feet deep, or something like that?

Mr. COOLEY. In places there was very little more than was necessary for the boat in which we went up.

The CHAIRMAN. It has been canalized, however?

Mr. COOLEY. Yes; it has been canalized up to Lafflores. I do not know whether it had been dredged the full depth or not.

The CHAIRMAN. Laflares is the place where the tide lock is located?

Mr. COOLEY. Yes; where the proposed tide lock is to be located.

The CHAIRMAN. And then there is a cutting runs out into the bay some 3 miles.

Mr. COOLEY. About 3 miles of an under-water cut on a mud bottom.

The CHAIRMAN. While we are on that point I will ask you who did that work. Was it done by the Panama Canal Company or by the Panama Railroad Company?

Mr. COOLEY. I understood that this provisional company, under contract with the liquidator, did the work.

The CHAIRMAN. This present company?

Mr. COOLEY. Yes; this provisional company which has a contract to organize a company in the future to build the canal. I understood that they did that work, that the Panama road is one of the assets in their hands virtually, and that they considered this approach and this landing stage really a part of the canal improvement, and at the same time a betterment for the railroad, which would enable it to do business to greater advantage, and that they had spent a good deal of money on the Panama road in betterments throughout.

The CHAIRMAN. The canal company has.

Mr. COOLEY. Yes.

The CHAIRMAN. Furnishing cross-ties, etc.

Mr. COOLEY. I understood that the road had been rebuilt in many ways—put into first-class condition.

The CHAIRMAN. Did you understand that was because the railroad would belong to the new Panama Railroad Company in the event of the failure of the canal?

Mr. COOLEY. I heard that afterwards—after I returned.

The CHAIRMAN. I have the statutes of the Panama company here which make that provision.

Mr. COOLEY. Yes, sir; I heard that afterwards.

The CHAIRMAN. That in the event that the canal is a failure, all the property of the canal company would revert to the liquidator, except the railroad.

Mr. COOLEY. Yes.

The CHAIRMAN. That the railroad would remain in the hands of the new company on payment of 20,000,000 francs?

Mr. COOLEY. That was in event of their failure to syndicate the canal.

The CHAIRMAN. And that therefore the canal company spent money on the railroad in betterments and improvements. The road was in good condition when you were there, was it not?

Mr. COOLEY. Yes; in better condition than it had been for years, so I was informed.

The CHAIRMAN. One witness has testified that they had got lignum vitæ cross-ties and put in.

Mr. COOLEY. I would not criticise them for that, because I think that is a proper thing to do, where you can get them for a dollar apiece, as I remember.

The CHAIRMAN. So that this channel out through the Bay of Panama, out to the shipping, and this structure which they call a pier there, was built in this way. That is a very fine structure, is it not?

Mr. COOLEY. Well, it is quite an expensive structure. I haven't it clearly impressed on my mind as to the length of it.

The CHAIRMAN. A permanent structure, though?

Mr. COOLEY. Yes; designed to be a permanent structure.

The CHAIRMAN. That was built by the railroad company under a contract with the canal company.

Mr. COOLEY. I do not know how they have divided up their accounts.

The CHAIRMAN. I will get that from the railroad people when they come.

Mr. COOLEY. I do not know how that is. That is a question of bookkeeping, I anticipate, as to how it is charged up.

The CHAIRMAN. While you were on the line there did you make any examination of the Culebra cut—a careful examination of it?

Mr. COOLEY. Yes.

The CHAIRMAN. What kind of material did you find in that cut as far down as they have gone?

Mr. COOLEY. It was such material as you would find pretty nearly everywhere in the Isthmus overlying the rock. It is originally some form of eruptive rock that has broken down or is breaking down to a red clay, and stands up in the cuttings very well indeed. It is such material as would ordinarily require some blasting for steam-shovel work, not worse than much that we have done at Chicago on several sections.

The CHAIRMAN. Did you go up onto the cut at Culebra, to the top of it?

Mr. COOLEY. We went up on the hill at Imperador. We did not go on the Culebra summit proper.

The CHAIRMAN. It is a very fine, deep cut there, is it not?

Mr. COOLEY. Yes.

The CHAIRMAN. Did you form an estimate or come to some conclusion as to the width across the apex of that cut—about the distance across at the top?

Mr. COOLEY. I do not now recall. I have a very full set of photographs showing cross sections of the cut and diagrams, but I do not now recall the width. The cut is made in very proper form. It steps down in benches, as should be the case.

The CHAIRMAN. In benches?

Mr. COOLEY. Yes; and some of the material in the upper portions of it showed some evidence of having slid, but I understood that such places were identified with some ravines or something of that kind that had been unwisely filled up, used for spoiling areas, and some seepage planes, which were confined, very likely. That was the thought that we had on the ground, that that was all confined to the upper strata and did not extend down to any great depth.

We did not see any physical difficulties in connection with the Panama proposition that could not be overcome.

The CHAIRMAN. Colonel Ernst mentioned the fact that in one of the wells or pits that had been sunk there a shark's tooth was found.

Mr. COOLEY. Well, that is quite possible. There is only one document that I am familiar with that gives a real analysis and discussion of the geology of the Isthmus of Panama. That was prepared by Robert T. Hill, under the Agassiz fund, and published at Cambridge in 1895. The formations of the Isthmus at that point would not go beyond the age at which sharks existed in the seas. However, my recollection is not clear enough now in regard to Mr. Hill's book to remember all that he says about the conditions there

The CHAIRMAN. But you rely upon that book as being an authentic statement of the geology of the Isthmus?

Mr. COOLEY. It is the best and only book that I know of that makes an examination of that question, and it was issued under the best of auspices, the Alexander Agassiz fund of Cambridge.

The CHAIRMAN. So we can get it by sending to Cambridge or elsewhere?

Mr. COOLEY. Yes; and that book on Panama also discusses the geological profile across Costa Rica, and makes a summary of all the known geological evidence, of the different expeditions for the entire Isthmus. It does not, however, enter upon the geology of the Nicaragua route.

The geology of the Nicaragua route is very fully treated by Dr. Hayes in the report of the Walker Commission, and, I think, very satisfactorily. Those two documents virtually comprise a summary of our extant knowledge.

The CHAIRMAN. Several of the gentlemen who were engineers of that Commission have stated that material brought up out of the bottom of these pits, which was wet and appeared to be of the firmness of rock, when exposed to the air and again put into water would dissolve almost instantly.

Mr. COOLEY. You refer to the borings at Bohio, I presume.

The CHAIRMAN. No; I refer to the material that is brought out of these wells that were sunk by the French engineers in the Culebra cut.

Mr. COOLEY. I would not know how to account for a phenomenon of that kind. What may be called slip seams do occur even in actual rock formations of the intrusive series of rock, and this may be some remnant of a seam, or some strata that has not leached out properly.

The CHAIRMAN. In the bottom of a great work like the Culebra cut, would you suppose that such material was safe?

Mr. COOLEY. It would be a matter of grave concern to devise proper treatment for such conditions.

The CHAIRMAN. Would you be apprehensive about it?

Mr. COOLEY. Yes, if it dissolved in that way. Of course, we might do as we sometimes do in quicksand formations. Simply allow this material to escape until the strata shuts down from above and pinches it off. It is liable, of course, to slides in the meantime.

The CHAIRMAN. To provide against slides and perhaps the disintegration of this material at the bottom of the Culebra cut, they have provided flanking walls along either side of the canal up to the level of the first bench.

Mr. COOLEY. Well, I believe a condition of that kind can be met. As to exactly how to meet it best, I would not be able to give an opinion unless I had studied that matter with great care.

The CHAIRMAN. But if the material upon which the flanking wall rested was as soluble in water as these gentlemen found it to be, would that be an element of unsafety in the maintenance of those walls?

Mr. COOLEY. Well, if the material moves like quicksand, it would be a pretty serious matter to know how to provide for that sort of a condition.

The CHAIRMAN. They propose to sink those walls some 8 feet or probably 10 feet below the bottom of the canal.

Mr. COOLEY. Yes.

The CHAIRMAN. You did not examine the locks, I suppose, at Miraflores, that is, at the western part of Culebra cut, or at San Miguel?

Mr. COOLEY. We went onto the lock site at Obispo, but if I recall aright we did not go to Miraflores. We did examine the situation at San Miguel. That is the first place where we got off the bottoms, going north from Panama.

The CHAIRMAN. I wanted to ask whether the material in the cut there appeared to be the same that it was on the eastern side of Culebra?

Mr. COOLEY. The material at San Miguel, which, as I recall it, is the point where you pass from the hills going toward Panama, and also at Obispo, where you really pass into the Chagres Valley proper, is a black rock, as I recall it.

The CHAIRMAN. Basalt?

Mr. COOLEY. Yes; a formation of the same class, which seemed to be entirely suitable for the purpose. I believe they rely upon it to make concrete.

The CHAIRMAN. I would infer from your statement that your opinion is that the entire Isthmus between Colon and Panama in that region of the country was originally volcanic.

Mr. COOLEY. That is true of all the countries from Guatemala down to the Andean chain, and the whole Antillean basin that surrounds the Caribbean Sea, including part of Yucatan. There is a quadrangle there of upheaved formations between the two continents.

The CHAIRMAN. Now, I will come to the Nicaragua side of the question. Some witnesses here have testified about the railroad construction from Greytown toward the divide, which goes for about eight miles through a swamp—I believe that is the fact, is it not?

Mr. COOLEY. Yes.

The CHAIRMAN. That they got the earth out of the location of the canal which was begun there by the Maritime Canal Company, which they ballasted with corduroy of logs through that swamp.

Mr. COOLEY. That road was built by Mr. Treat, whom I know very well, and that is the way he built it.

The CHAIRMAN. Mr. Treat has testified here, and it is his testimony to which I refer.

Mr. COOLEY. Yes.

The CHAIRMAN. Mr. Treat speaks of that superstructure or bed of earth laid over those logs as having been very permanent and very compact.

Mr. COOLEY. We went over the whole length of it in 1898, and there did not seem to be any settlement at any point. The trestles were in a perilous condition over some of the streams; the cross-ties were rotten, but once in a while you would find a tie that was sound. The iron was in good condition, and it looked as if \$5,000 or \$6,000 per mile would put the road into first-class condition.

The CHAIRMAN. Was it a good, permanent road, the road built through the swamp?

Mr. COOLEY. It looked as if it could be put into first-class condition with that expenditure.

The CHAIRMAN. Mr. Treat spoke of the material of which that road-bed was composed, and said it was not ordinary sand, but sharp sand or detritus, I suppose from volcanos?

Mr. COOLEY. Yes.

The CHAIRMAN. Brought out from Costa Rica by the San Carlos River?

Mr. COOLEY. Yes. The San Carlos and Sarapiqui.

The CHAIRMAN. I wanted to ask you, in your examination of the country between Greytown and Tambercito and up the river from there, whether you found the material in the direction of the San Juanillo, or the San Juan, or any of those places, was of like quality with that which I mention here?

Mr. COOLEY. We did not go up the Sarapiqui. That is below our dam site. We did go up the San Carlos as far as the captain would run the steamboat—quite a little distance. The water was pretty high, and from what I saw I accepted the idea that originally the material, much of it, came down the San Carlos and the Sarapiqui.

The CHAIRMAN. Do you mean the material lying between the San Juan River and Greytown?

Mr. COOLEY. Yes; that was the original source probably of most of it.

The CHAIRMAN. All of that delta in there?

Mr. COOLEY. Yes.

The CHAIRMAN. Made out of that detritus?

Mr. COOLEY. Yes.

The CHAIRMAN. Brought out of the Costa Rica mountains?

Mr. COOLEY. Yes; largely. At the same time it is not necessary that it should have come from the mountains, because the entire plain is deeply cut and dissected by streams. I do not know of anybody who has been up those rivers a great distance and explored them thoroughly; but that is my impression.

The CHAIRMAN. Is the San Juan River between the San Carlos and the lakes a silt-bearing stream?

Mr. COOLEY. No, sir; there is no silt there of moment. The best evidence of that is the Agua Mertes. It is what its name indicates, a dead water above the San Carlos, extending clear up to Machuca, deep enough for an ocean steamer to run in its natural condition. Enough silt has never come down the San Juan to fill it up.

The CHAIRMAN. There are no affluents of any great magnitude, I suppose, between San Carlos and the lakes into the San Juan River?

Mr. COOLEY. Well, no first-class streams. The ridge line is off a few miles on the north, and there are quite a number of small streams coming in there, like Machuca Creek and the Labolos; also some from the south.

The CHAIRMAN. While you were there were the lakes—Nicaragua and Managua—at flood at any time?

Mr. COOLEY. No; I think the lake level stood at 105.

The CHAIRMAN. Above sea level?

Mr. COOLEY. Yes. Low water is down to 102, and it stood at about 105 when we were there.

The CHAIRMAN. I suppose you looked out for marks on trees and other evidences of high floods?

Mr. COOLEY. Yes.

The CHAIRMAN. Did you find any indications that the river had ever been at a very high stage?

Mr. COOLEY. Not recently. That is, the flood marks had virtually disappeared. There were no high flood marks. The evidence of high water is, I think, derived from the pier at Granada. There is no evidence of active silt contributions anywhere in the upper San Juan. There is no evidence of active silt contributions from the Rio Frio, for instance.

The CHAIRMAN. That comes in above the exit?

Mr. COOLEY. Immediately at the exit. The lake bottom is covered with several feet of very soft mud, so soft that a steamboat will plow into it and come to rest like the putting on of the air brakes on a train. That is clear evidence to my mind of no heavy detritus coming down from the stream in that part of the lake, and also that there is no sea. In fact, there is not enough sea on that side of the lake to produce a well-defined beach. The marine growths extend right along the shore.

The CHAIRMAN. How would the floods in the San Juan compare with the floods in the Chagres?

Mr. COOLEY. The floods in the San Juan proper?

The CHAIRMAN. I mean from San Carlos.

Mr. COOLEY. The floods in the San Juan proper are nominal. It is a lake-controlled stream, and you could hardly speak of floods there, only in a minor degree from local streams, any more than you could down the St. Lawrence, or on the Great Lakes. There is a variation in the volume of the water, but nothing in the nature of a flood as we understand the word flood.

There are floods of course from the southern tributaries, from San Carlos down, and the estimate of those floods would indicate that you get the equivalent of a northern stream with an area about five times as great. For instance, take the San Carlos, which has an area estimated at 2,300 square miles, and its bed conditions and what is reported in regard to the volume of its floods would not differ greatly from northern streams of five or six times that area, say *ten or twelve thousand* miles, in Illinois, or in Missouri, or in Pennsylvania, as the Allegheny River. And when you have said that in regard to this stream, and compared it to the equivalent stream in the United States, you have said all there is to it for practical purposes. The silt conditions in San Carlos are not to be compared, for instance, with the Missouri or the western tributaries of the Mississippi. We judge by the shore lines, and the flood planes, and the physiognomy, if you please, of the stream.

I think the forces that produced these delta formations are largely spent, as the volcanic forces are largely spent in those countries. Probably the most of that contribution along that shore was produced at a time when there was a plain that was being eroded by streams, and those conditions have now reached a state of substantial stability, and it is only under some unusual conditions that an abnormal amount of detritus is now produced. Normally the great contributions have ceased.

The CHAIRMAN. Mr. Morison, in his deposition, spoke of the material at the Bohio dam site, and said it was a recurrence of sand and gravel and blankets of clay, and that he did not know whether those blankets of clay outcropped in the river above or not; that pipes had been driven through the same strata on the shore of the Chagres River, and that when they got down to those sands on the line of the banks between the clay that the water rose in the pipes to the level in the river. That would indicate, I believe he stated, that there was a permeable material lying between this blanket of clay that was in there.

Mr. COOLEY. From the way most river formations are laid down, and from borings, for instance, in the Missouri and Mississippi bottoms and in our drift deposits in the north, you would anticipate that you

would find a great variation in the stratification, within relatively narrow limits, and that these blankets would not extend indefinitely.

The CHAIRMAN. In locating a clay dam or earth dam, with ripraps or rock filling behind, as you indicate you would prefer to do at Tamber Grande, and puddling it above——

Mr. COOLEY. If you want that additional insurance.

The CHAIRMAN. If you puddle it above, if you undertake to overcome the conditions which Mr. Morison described at Bohio, you would have to extend your puddling so as to extend beyond this material.

Mr. COOLEY. I should not be especially concerned in regard to any seepage that came over a long distance, because I know that it would not be large in amount. You could make a sand bank, without puddling, long enough to reduce the seepage below any assignable amount; and as long as it did not concentrate and did not have a ground-water plain sufficient to disturb anything beneath, to produce a mud spring or something that brought material with it, it would be perfectly safe. I would not be so greatly concerned about making it tight, though it may be well to do so.

I know this, however, that rivers carrying silt will puddle their beds. That has long been known in regard to galleries, which are often driven along the side of river beds for the purpose of securing a water supply. The filtration of the water from the river toward this filter gallery brings with it the roily water, and gradually fills the interstices between the grains of sand and it becomes tight, and you get a decreasing supply of water.

We had that case on the Chicago Drainage Canal, where we were building a canal that was more than 40 feet below the high-water level of the Desplaines River, not 100 yards away, for more than 2 miles.

The CHAIRMAN. That was on the drainage canal?

Mr. COOLEY. Yes; at Chicago.

The CHAIRMAN. In the Illinois River?

Mr. COOLEY. On the Chicago Drainage Canal adjacent to the Desplaines River, near Willow Springs, there was a muck bed 20 or 30 feet deep.

The CHAIRMAN. How long was that muck bed?

Mr. COOLEY. Oh, a couple of miles; and we proceeded to dump into this muck bed the ordinary material excavated from the channel, clay and boulders and gravel—a miscellaneous dump there—and we ran an embankment right through it, and it settled down and produced a great heaving of the muck, as it was displaced, until it reached a firm bed. In fact, it completely closed the river on the opposite side, so much so that we had to go in and dredge the river out again; but it produced a perfectly stable bank, and when the channel was eventually constructed alongside the river we got no water through that 2-mile bank at all that could be discovered. We cut into the strata for several miles above and for several miles below, in clay and gravel formations and river deposits.

We were farther away from the channel then, perhaps, a quarter of a mile at the extreme upper end. And notwithstanding cutting into those strata and our channel being so far below the water in the river, we got substantially no water from the river. In other words, those percolating lines, when you make them long, yield water slowly; and if there is any water coming from a body of water that has mud in it, it will seal itself. You can always rely upon that as a phenomenon that is sure to occur.

The CHAIRMAN. If the Illinois River was as torrential as the Chagres you would have some apprehension of its breaking through the bank. would you not?

Mr. COOLEY. Well, if it got over the bank, it would go. You would not want it to do so.

The CHAIRMAN. The Illinois River runs through a level country.

Mr. COOLEY. It is the Desplaines River, properly, at that point. It occupies the valley which we use for the sanitary canal for 20 miles. We go into the valley about 8 miles from Chicago, and we dedicated one-half of the valley to the usage of the river, and put it over on that side, and built a wall, you might say, down through the middle of the valley from one end to the other, and dedicated the other half to the use of the canal.

The CHAIRMAN. Was that an actual wall?

Mr. COOLEY. That was a levee or embankment line.

The CHAIRMAN. No rock core, or anything of that sort?

Mr. COOLEY. Oh, no; it is not a high bank. It is only 12 to 15 feet above the river bed.

The CHAIRMAN. I should like to get some facts in regard to the Chicago Drainage Canal, because I look upon that as the most successful work that has ever been constructed in America, or, I believe, in the world—30 miles of canal built for \$30,000,000 through a material, if I am correct about it, a large part of which was limestone rock.

Mr. COOLEY. There was 15 miles continuous in which the canal was in a rock bottom. Then there was a mile or so toward Chicago also with rock bottom; but this continuous stretch, 9 miles of it, was rock that practically came to the surface of the ground, with very little covering, and 6 miles of it we built up with a retaining wall to the proper level, where the rock did not reach the surface.

There was involved in that work and in the rock that we took out of the river diversion 13,000,000 solid yards of rock. Thirteen million yards represent a square mile 13 feet deep. That is about what it amounts to. A million yards, as a general statement, may be taken as a square mile a foot deep.

The CHAIRMAN. How would the rock taken out of that canal compare in cubic yards with the rock that you would take out of the Nicaragua Canal?

Mr. COOLEY. I do not now recall the volume of rock that was included in our estimate, but the rock at Nicaragua is considerably more. The entire physical quantities at Nicaragua would come to about two and one-half drainage canals, if they were reduced to an equal basis, after the preliminary work is done.

The CHAIRMAN. Would the rock be greater in the Nicaragua route than in the drainage canal?

Mr. COOLEY. Yes, it would be greater; but I do not now recall the figures that I made up for that.

The CHAIRMAN. There is no rock, substantially, in the Panama cut. is there?

Mr. COOLEY. Very little, except at these two points already referred to.

The CHAIRMAN. Indurated clay and other material like that?

Mr. COOLEY. Yes. Our experience at Chicago from the construction standpoint, although we were extremely apprehensive at the outset, was that we rather wished it was all rock before we got through. After you have made an installation and got your work fully organized and defined in rock, which costs a great deal more than it does to

install for earth, the subsequent operations are absolutely certain, like a manufacturing enterprise. It is yard for yard, whereas in earth work there is a very great variation in quality and in conditions. Earth is anything. Rock is definite.

The CHAIRMAN. I wish now, Mr. Cooley, to get your views on the commercial and military advantages of the Nicaragua route as compared with the Panama route, for the benefit of the United States Government and the people of the United States, and I will begin by asking you first as to the possibility of a local development of production and concentration of population on the Nicaragua route; and the basis of that would be, first, the temperature of the country and its healthfulness. I ask you now, if you please, to describe that country with reference to this matter.

Mr. COOLEY. I looked into that phase of it for the reason that, as a commercial enterprise, which was then proposed, the question of what assets could be created by a corporation building the canal there was a very material question as to its profits, and whether it was justified in undertaking the scheme at all or not.

Nicaragua lies practically in the same latitude north as Java of the East Indies lies in the south. It has every variety of climate, from the lowlands, where they produce indigo and cocoa and various fiber, plants and fruits, clear up to the frost line.

The CHAIRMAN. Rubber?

Mr. COOLEY. Rubber trees, yes; and at an altitude of 1,200 to 1,500 feet you strike the coffee belt, extending to the frost line, and up at the frost line and above you can raise the northern cereals and vegetables. At a market in San Jose I saw a collection of kitchen truck raised in Costa Rica near the frost line in the month of February that would duplicate a northern market garden.

You can select your climate. Nicaragua, Honduras, and Costa Rica, in an area of perhaps 50,000 to 60,000 square miles naturally tributary to the Nicaragua Valley—more than the State of New York, more than the island of Java—has every variety of climate. I mention the island of Java because it is one of the most highly developed spots on earth, carrying a population of 24,000,000 on 47,000 square miles. I believe that Nicaragua has as large a potential, from the Pacific at the Bay of Fonseca through to the Caribbean. Whether the country east of Castillo will be susceptible of much development I do not know. They have developed a good deal on the Rama River, and at Bluefields and at Limon they have done considerable in the way of producing bananas. The bananas of the United States coming into New Orleans come largely from Bluefields, and the bananas going to New York come largely from Limon, Costa Rica, and in the interior you can produce everything that a tropical country produces.

As to the health conditions, I made diligent inquiry, on the western division, of Dr. Flint, a man over 80 years old, at Rivas, who has lived in the country since 1848 as a practicing physician, and of Dr. Cole, who has been there since 1854, at Rivas. I could not learn that they had any diseases which we need be apprehensive about, especially on the western division, and that it was immune, you might say, from such things as kidney troubles and rheumatism.

The CHAIRMAN. Pneumonia?

Mr. COOLEY. No; they have pneumonia everywhere on earth. Tuberculosis is not in the country, I believe. I asked Dr. Flint, after

I had gone over the entire catalogue, what the people really did die of, because it was evident that they died. He said that the majority of the death rate in this country is due to lack of proper nutrition and to dissipation.

On the Atlantic side we had Dr. Soto, who accompanied our party as physician to see that none of us got into ill health, and we got from him the statistics of what little experience they had had at Greytown with the force that they worked there when he was the company's physician. He asserted that there had never been a case of yellow fever at Greytown, unless it was sporadic, and had been brought there. There had been only four cases that he knew of as a matter of fact, and that the so-called yellow fever, jungle fever, spotted fever, or whatever you call them, which all belong to the meningitis type, were not virulent. That was also the testimony of Dr. Flint and Dr. Cole.

In 1900 a physician came to my place in Chicago and wanted to go somewhere in the Tropics. There were four of them in the party bent on new experiences and scientific collections, and I advised Nicaragua and asked that they investigate especially the health condition there.

One of these gentlemen turned up in my office three or four months ago. He had spent four months in Nicaragua, and as a physician he had inquired diligently. He had spent part of his time in the Silico lagoon country down around Greytown hunting alligators and collecting specimens for museums. He said he had absolutely no trouble, and he finally summed up the situation as his personal opinion that no man need die in Nicaragua except of old age, if he will take care of himself.

Now the evidence of our own party was that we took 15 men across the Isthmus. It was a question whether we should make special provision and take special precaution about the water and things of that kind. Mr. Mason very sensibly remarked that if we ever did business in that country we would have to drink the water that was in the country and he was going to drink it all. So we all did the same. We drank all the water we came to, from one side of the Isthmus to the other.

The CHAIRMAN. Took it as you came to it?

Mr. COOLEY. Oh, yes. There were some streams that we avoided, of course, used our horse sense about, just as we would in the United States. And there was no man in our party who suffered from it. On the Pacific side we rode horses and some of us had not been on horseback for years. Some were men of age, and we went right out there for four days and camped on the ground, and slept out nights. On the Atlantic side we walked under very great fatigue and camped out every night, and no man was inconvenienced, although the fatigue was as great as you could experience under any conditions in the United States. None of us experienced any inconvenience except Mr. Stevens, who ought not to have taken that trip, because he was a man nearly 60 years of age, and he got very much exhausted, tired out, and when he got up to San Jose, Costa Rico, he had a little touch of intermittent fever that lasted him a week and was very light. That was the only experience of that kind we had. And I feel confident that if we had stopped at Greytown a couple of days longer and rested, he would not have come down with it.

The CHAIRMAN. Is that a good fruit country?

Mr. COOLEY. I was shown an orange tree at Greytown from which they had picked 200 boxes of fruit the previous year.

The CHAIRMAN. Two hundred boxes?

Mr. COOLEY. Yes.

The CHAIRMAN. About how many in a box?

Mr. COOLEY. I don't know how many. There are about 125 in the ordinary shipping box. That was told to me by the consul at that point. At Castillo I picked limes off of trees that were loaded.

On the Pacific side the oranges were growing wild. There was no market for them. The citrus fruits, I think, grow well all the way across.

The CHAIRMAN. And cocoa?

Mr. COOLEY. Yes; that is the chocolate bean. Manier, the French chocolate man, whose brand you buy all over the country, has his plantations near Rivas.

The CHAIRMAN. Is it an attractive country in its topography and scenery?

Mr. COOLEY. The shores of Lake Nicaragua are beautiful as a dream. Lake Nicaragua is about half as big as Lake Ontario. If I was leading the ideal life which some people are striving for I should spend six months of the year on Lake Nicaragua, or in that valley there, after this canal was opened.

The CHAIRMAN. How do you think Lake Nicaragua would do for dry docks and shipyards?

Mr. COOLEY. There is no reason that I see why that should not be done. If you do this on the plans I speak of there is no reason why you can not produce 200,000 horsepower at the two ends of the canal and create manufacturing plants, if such things will thrive in those latitudes. At least there would be use for the power in recoaling ships and doing a whole lot of things.

If you can plant a population there of white men, which I feel fully confident can be done, they have the world for a market. Vessels from all the world would be passing there. There would be a place for supplies for ships, a place for ships to coal. You are within 1,200 to 1,300 miles of Mobile, and we got coal quotations from Mobile at \$1.50 a ton, and with the promise that when they get the slack-water river improvements completed in Alabama, coal can be laid down there at a dollar a ton. There is no reason why we should not place good steaming coal at Greytown and make it one of the cheapest coaling stations in the world. There is no reason why we should not outfit ships there. There is no reason why you should not get supplies for the journey either way.

The CHAIRMAN. Or build ships?

Mr. COOLEY. Well, I do not see any intrinsic reason why you should not do that. You should be able to dock them and repair them, without question.

The CHAIRMAN. The building would depend upon the facility with which you could get timber from Oregon on the one side or steel and iron from the other side?

Mr. COOLEY. There are considerable timber resources in the northern part of Nicaragua and in Honduras. Now, taking all these conditions into consideration, I believe the country to be very valuable for inhabitation, and it has as many resources, as I have said, as Java. As the population is now nominal, you can put in there the kind of population you want.

Now, coming on to the other point, it seems to me that the very idea of putting good American people in there, who I think could be induced to go there in great numbers, it seems to me would settle the question of protecting the canal. Americans are going down to Tehuantepec now to raise coffee and things of that kind. There are some few in Nicaragua for the same purpose. I was about to say that if you put a good American population in there your canal is absolutely secure, from the military standpoint, as secure as it would be in the State of Illinois. It is not a question of fleets; it is not a question of fortifications at either end of it, or special rights or privileges or negotiations, it is a question of a country that you can put your own people in to look after your interests. I think the technical question of sovereignty will take care of itself with the future growth of population. I do not think there would be an objection from any of these people now in that country. I think they would welcome just such a population.

The CHAIRMAN. At Panama we have from 25,000 to 30,000 people. You saw them. What is your idea of their character?

Mr. COOLEY. Well, at Panama there are no great resources. The population there has lived off the drippings of commerce, and it has all the elements of a man who makes his existence by collecting fees and tips.

The CHAIRMAN. Or robbing somebody, I suppose.

Mr. COOLEY. Perhaps it would be unjust to them to say that they are a parasitic population. At the same time they exist there by reason of the commerce that is crossing there, and not by virtue of the intrinsic resources of the site.

The CHAIRMAN. In the vicinity of Panama, or along the line of the railroad or the canal, did you observe any extensive agriculture or other productive work?

Mr. COOLEY. No, sir; there are some developments, I understood, in the highlands back of Panama, but I did not have the opportunity to go into the country to see what those developments were.

The CHAIRMAN. Between Panama and Colon was the country densely populated?

Mr. COOLEY. It is not what I should call densely populated. There is not a highway through it. They raise some cattle there, and if a man wants to take his cattle to market he drives them on the railroad track. That is the only common highway there is.

The CHAIRMAN. They have no roads?

Mr. COOLEY. No, sir; there are some bridle trails.

The CHAIRMAN. I suppose the population at Colon is very little different from that at Panama?

Mr. COOLEY. Well, there is more at Panama, and the business relations are at Panama. Colon is a sort of entrepôt for Panama rather than a town.

The CHAIRMAN. Around in the vicinity of Colon are there any farms?

Mr. COOLEY. No; you are in a swamp right away. You can not walk out of town without falling into a swamp, and the sanitary conditions are very, very bad. I think they would have any kind of fever if they lived under the arctic circle.

The CHAIRMAN. I want to ask you about the rainfall at Greytown. It seems to be peculiar and very heavy, very frequent, and not to extend

far into the country, according to the testimony before the committee. I should be glad if you would describe it, and what effect you think it has upon the health and what is the cause of it.

Mr. COOLEY. The rainfall record up to the time that I went there, was, I think, a little over 250 inches. I understand that later records have reduced that to 240 inches. Our information was that we would have about two-thirds of that rainfall on the divide, and perhaps not so much at San Carlos, for instance, and by the time we got up to Castillio and above, we would have about normal for the coast. The normal for the coast, at Bluefields and Limon and Colon, is all about the same, about 120 inches. The normal for the Pacific coast is from 60 to 90 inches, or about the same as you have at Mobile and New Orleans. It does not differ very much on the Pacific side from what you have on the Gulf coast of the United States, and no more than is necessary, or so much really as would be desirable for the purposes of vegetation. I consider that 120 inches would be normal, for that country, or equivalent to 36 or 40 inches in our Northern States.

I know of no reason for the excessive rainfall at Greytown as compared with Limon and Bluefields, 60 miles away, except the drawing in of the trade winds by this trough across the continent acting like a funnel, by which is brought in double the amount of saturated air and which precipitates double the amount of moisture. So you have across that part of the Isthmus double the air circulation after the moisture is squeezed out of it.

The CHAIRMAN. As soon as that saturated air coming across the Caribbean touches the colder air the moisture is precipitated?

Mr. COOLEY. As soon as it strikes the land it is thrown down.

The CHAIRMAN. These are not rain storms which come up with lightning and wind?

Mr. COOLEY. Oh, no; the same as they have all along the coast.

The CHAIRMAN. And you attribute the unusual rain there to the fact that the funnel that opens through the Cordilleras there and across the lakes draws in the trades and other winds from the Caribbean, which, being saturated, the moisture is precipitated as soon as the winds strike that coast?

Mr. COOLEY. Surely; yes. The very conditions which account for the healthfulness of this strip of territory are the conditions which produce the excess of rainfall, and if you did not have that rainfall excess on that coast you would not have the health conditions which exist at Nicaragua and do not exist at the other points.

Now, the recognition of that fact goes as far back as the writings of the old pirates, who recognized what they called the papagayo winds, coming off the shores of Lake Nicaragua when they sailed up the Pacific. In their journals they warned navigators against these papagayos, whirlwinds, that come off the land, just as they recognized a similar condition at Tehuantepec. There they are known as Tehuantepecers. Those are also recorded in the ancient annals, and were also avoided, as they are now avoided by the Pacific mail steamers, which often run in close to the land to avoid those heavy winds that come across.

The CHAIRMAN. Do the same currents of wind come across the Isthmus between Panama and Colon?

Mr. COOLEY. No, sir; that is in a calm belt, that is shown by the beach formation to be so, except so far as it may be obscured by the

very high tide on the Pacific side. It is notorious, and has been so from the earliest times, and was especially recognized by Maury in his discussion of the subject of winds and ocean currents. I think his book came out prior to 1860.

The captain of the *San Blas*, on which we went up the Pacific coast, said to me that he had met a sailing vessel in the offing in rounding Cape Mala, which runs about 150 miles to the south—they have to go south before they can go up the coast—and that he had gone with his steamer to San Francisco and back before that sailing vessel got into the port of Panama.

The CHAIRMAN. She was making for the port of Panama?

Mr. COOLEY. Yes.

The CHAIRMAN. And could not beat in?

Mr. COOLEY. To make the trip to San Francisco up that coast and back takes probably about forty days; something like that, forty or fifty days. They have trade winds at certain seasons on both sides, more or less, but not continuously.

The CHAIRMAN. Not reliable winds for sailing ships?

Mr. COOLEY. Not reliable winds for sailing ships.

Now, I wish to say, in regard to this sailing-ship question, that I do not agree with the idea that the sailing ship is an obsolete institution by any manner or means. I think the sailing ship, as it existed in the olden days, the square-rigged, magnificent canvassed ship, has passed away, as the paddle-wheel steamer has passed away; but, possibly stimulated by the example of the Great Lakes, all the new tonnage in sailing vessels belongs to the fore and aft type, schooner-rigged, which can be handled without going aloft and by few men, with steam winches. They are the ships that are now building. I was told recently by a Baltimore gentleman that within the last few years a very large coal trade has been built up between Chesapeake Bay points and Boston and New England points in sailing vessels, four to seven masted schooners. That fact surprised me when I learned of it, because I knew that heretofore there had been a large trade along the inland waters of that shore, mostly built up with tugs and barges; but here is an outside trade which has developed recently.

I should not be any more surprised to see a future development in sailing vessels than the world has been surprised to see the recent development in water power, which was supposed to have become obsolete ten or fifteen years ago, owing to the great development of the steam engine; and yet water power was never more actively developed than it is being developed to-day.

And the same thought occurs to me on the subject of waterways. We have a lot of people in this country who have believed that interior waterways, for instance, have passed their usefulness, that the railroads are going to take their place; but if you go over to Europe and study this question you will find there was never a time in the history of the countries of Europe when there was so much being done in the way of development of waterway systems and canals as there is to-day; and that too in countries that absolutely control their own railroads.

So the appearance of things is not a good basis for reasoning, unless you know the causes that lie behind those appearances.

I want to speak right in that connection of one or two things that occur to me.

Here was a vessel that went out of New York, a tramp steamer, within the last year, carrying a cargo of grain for Liverpool. When it arrived at Liverpool the conditions of storage and of market were such that that vessel was sent to South America and back in order to kill time, simply because that freight could be kept in the hold of the steamer until it was wanted more cheaply than you could handle it and store it at Liverpool.

You get the same idea involved in the coal trade of the Ohio and Mississippi rivers to New Orleans, where barges are built, and the barge is a kind of a package and storehouse combined, and the freight stays in the package until it is used.

I made some figures for the Deep Waterway Commission and went into that steamship question pretty fully. And you can to-day build a ship, if it was possible to reach Chicago with it, in which you could load 500,000 bushels of wheat, and you could come pretty nearly sailing that vessel around the world as cheaply as you could carry that wheat in store for the same time, with the insurance and all the expenses attaching thereto, and the value of city real estate, elevators, etc.

Now the point is this: The sailing vessel and the tramp do the pioneer work of the world. Then come in the liners with subsidies, the mail carriers. There is more than an excess of tonnage in the different competing lines of the different nations on these mail-carrying routes, to hold the freight; but when you get beyond the capacity of these special lines, then you will come back to the point where you will see these cheaper carriers; and when the question of time does not cut so much figure as it does now, and the element of storage comes in, you will use the sailing ship in the idea of a package and storehouse in which you can carry your freight, because it is economical to do so.

There is a further thought which I wish to elaborate in that connection. In the days of the clipper ships of this country, when we controlled virtually the shipping of the world, prior to the war, there was an evolution, if you please, from the fishermen. They were built by the fishing population along the New England coast. The narrow limits of a fisherman's boat and a fisherman's life were exceeded by many men who wanted to go into the merchant business of the world, and they became the owners of clipper ships and controlled the commerce of the world with their enterprise and ability, and notwithstanding the fact that these ships were not great carriers, they were fast sailers and commanded their own rates. You have got that same population to-day, and as long as that population exists there will be the desire and the inducement for the same men to own their own ships and run them, and there will always be sailing ships as long as that blood courses in the veins of our people. I do not know whether there will be much or little of this, but in my judgment it is wise to preserve the potential and not to throw it away.

The CHAIRMAN. Is not the consumption of coal in all manner of manufacturing industries, as well as in transportation by rail and also by water, a very important factor in these calculations?

Mr. COOLEY. Yes.

The CHAIRMAN. Unless there are immense discoveries in the coal fields, the time must come when the price of coal will be very much enhanced by the consumption that is going on, which is simply enormous.

Mr. COOLEY. Well, of course, that time has come in Great Britain, where the field is limited. It is hardly possible to conceive on any basis that we can figure of such a condition obtaining in this country.

The CHAIRMAN. Great Britain and Germany are both, I understand, on the point of importing coal?

Mr. COOLEY. There is a continual advance, of course, in the economy of its use and in the use of other powers in place of coal, and a man would be perhaps unwise to attempt to predict what the limits of that might be or to assume that there were any.

The CHAIRMAN. Taking the route through Nicaragua as a sailing route, and going up the coast to any port of the northern Pacific, are there any advantages in favor of sailing ships over the route at Panama?

Mr. COOLEY. Why, I consider the conditions at Panama to be so uncertain that you could almost say that sailing ships would not be able to habitually navigate that route; that it would be a risk too great to undertake.

The CHAIRMAN. As to the productive power of the country lying south of the equator in South America and its accessibility to the ocean for transportation, what have you to say as to that?

Mr. COOLEY. There is nothing in the South Pacific that is of very great moment. "When you get to Australia, you are practically dominated by the Suez Canal." There is New Zealand and the islands of the sea. That is about all south of the equator, except the west coast of South America. Take the State of Colombia, and its outlet is practically on the Caribbean. I do not recall that it has a port on the Pacific. Ecuador has a port; Peru has a port, one or more. When you get half way down Chile, then it is an around-the-Horn route. In fact, it is an around-the-Horn route as soon as you strike Chile, because, if you are going to pay a dollar toll, and that is what I assume in making up some figures, you can sail a ship 3,000 miles for a dollar rather than pay the dollar and possibly more. So that you are not going to get any trade on any distance on a toll proposition as long as they can reach that point without paying toll by going 3,000 miles farther. That shuts you out of more than half the west coast of South America, as far as European traffic is concerned. It shuts you out of a third of it as far as the United States is concerned. It will pay to go around the other side.

So you can see that all of the west coast of South America that is actually tributary to this canal is Ecuador, Peru, Bolivia, and about half of Chile and that portion of the west coast extending over to the Amazon forests which represented the old Inca Empire, about a million square miles. And Squiers, in his book on the Inca Empire, published along in the seventies, I think—and Squiers was an antiquarian of recognized authority—states that the people had reached the supporting limit of the soil on this 1,000,000 square miles, and that they did not probably at any time exceed 10,000,000 people.

The present population, including the descendants of the Inca population, is only about 5,000,000. So that that entire coast tributary to the Nicaragua Canal would not equal the State of Illinois in potential for supporting a population. It is not there. I get confirmation for that view that I derived from Squiers in a report that was issued here three or four years ago by the Agricultural Department, a collection of consular reports on South America and its resources, which attempted

to sum up the actual resources of every country of South America. A person who has not looked into that would be surprised to find how poor in aggregate resources South America is compared to North America.

Over half of this 1,000,000 square miles is a Tibet, for instance, the part around Lake Titicaca, where the climate is so rigorous that you can not ripen barley. They have a kind of small grain, like a mustard seed, and small potatoes about the size of pigeon eggs, and that is the condition of over half of that 1,000,000 square miles. Outside of the mines, I do not see anything to it.

The CHAIRMAN. Referring to the State of Illinois, of which you have spoken, the drainage canal which you constructed is now sufficient for very useful commerce, is it not?

Mr. COOLEY. Well, it extends about 34 miles from Lake Michigan, and with the money that has been put into it and with what we expect to put into it at Chicago it will aggregate something like \$50,000,000. We are before Congress for a final survey on the basis of from 14 to 18 feet of water between the end of the canal and St. Louis, which we estimate can be developed for \$35,000,000 or less.

The CHAIRMAN. Your present terminal points, then, are expected to be Chicago and St. Louis?

Mr. COOLEY. That is the original conception.

The CHAIRMAN. That is not the ultimate conception?

Mr. COOLEY. No; we want to do that part of it at Chicago ourselves and to persuade Uncle Sam to do the balance.

The CHAIRMAN. But you expect the ultimate terminal of that system of canal to be on the Gulf?

Mr. COOLEY. Oh, yes; surely. We expect to do a barge navigation through that route, as soon as we can reach St. Louis, for more than six months of the year on a draft of 14 feet, and to carry in a fleet of six of those barges over 20,000 tons of freight, and to put every one of those barges into a shoestring and tow them anywhere around the Gulf and Caribbean—lake-going and seagoing barges, though not for the broad ocean.

The CHAIRMAN. Then if the States to the south of Illinois do as much as Chicago has done in the development and the opening of that canal it will not be a very great while until the canal is completed?

Mr. COOLEY. It is hard for me to see that we at Chicago are especially interested in a canal except on the theory that it is going to aid our business with the Gulf and that we are going to have additional facilities besides the railroads to do it with. Otherwise I can imagine that a canal so remote as Panama might be a detriment to us. If we could build a canal at Tehuantepec, it would be ideal so far as the Mississippi Valley is concerned, on account of the saving of distance. Of course, Tehuantepec not being feasible, the saving of two days by the Nicaragua route to all of the trade except that of the west coast of South America, which is not large, the saving by the Nicaragua route to all of the trades that we are most interested in is very material.

The CHAIRMAN. You speak of a saving of two days in arriving at the eastern exit of the respective canals.

Mr. COOLEY. I speak of it in this way: The Commission state, for instance, that from New Orleans to San Francisco the Nicaragua route, including the length of the canal, is 570 nautical miles shorter than by Panama.

Now, they also state in the same connection that a boat will be able to go through the Panama canal in twelve hours and that it will take thirty-three hours to go through the Nicaragua. I want to modify that statement a little in this way: If the Panama route was a strait between two bodies of water, a boat would go across there in about four hours, so that the time lost on account of the canal is eight hours. On the Nicaragua route the distance is 160 nautical miles, and a 10-knot boat would go through in sixteen hours if it was a strait. And, mind you, this question of length does not cut any figure as long as you are going in the direction in which you wish to go. It makes no difference whether it is on a river or on a lake, so long as you are going in the right direction. As I say, a 10-knot boat would go through a strait 160 miles long in sixteen hours; so the time lost on account of the Nicaragua Canal, by their estimates, is seventeen hours.

As I stated in my first estimate here, I think probably the total time could be reduced to twenty-four or twenty-six hours, so the time lost would be only eight to ten hours, not much more than it is at Panama. Say we lose seventeen hours at Nicaragua and eight hours at Panama, according to the official estimate; in other words, you lose nine hours more at Nicaragua than you do at Panama. In those nine hours a steamer will steam 90 miles; so that the equated length between the two routes is not 570 miles, but 480 miles. You save the equivalent of 480 miles, which is just exactly two days of steaming; from all ports that use the Yucatan Passage to all ports that trail the coast of Mexico on the great circle, which are the ports north of the equator, you save exactly two days. Going by the Windward Passage from points north of Hatteras, which is the way that the traffic goes outside the Bahamas, the saving is about 200 miles less. Still, that is a positive saving of over a day. That is material. You are building this canal for the purpose of saving distance.

The CHAIRMAN. In building a canal across that Isthmus, can we afford to give up the advantages of one route over the other, for sailing ships—exclude sailing ships from the calculation?

Mr. COOLEY. I would keep the benefit of the doubt on the side of the sailing ships, by all means.

The CHAIRMAN. Both for profitable use of the canal itself and also as a general proposition?

Mr. COOLEY. I think it is a very unwise man who says that the sailing vessel as an agency of commerce has become obsolete. I think he is dealing with the appearance of things and not with the philosophy of them.

The point I was going to make further was this, that you are building this canal to save distance. You save 9,500 miles, we will say, by Panama, and you save 10,000 miles by Nicaragua from New Orleans to San Francisco by those routes. That is 5 per cent. You can afford to pay 5 per cent extra to save that 500 miles. If you are paying \$190,000,000 for 9,500 miles saving, you can afford to pay \$10,000,000 more to shorten that 500 miles more, assuming that the distance is worth the same as the 9,500 miles you have paid for. On that basis you can afford to pay \$10,000,000 more for the Nicaragua Canal.

Take it on a further point. We will assume that a vessel can steam 3,000 miles for a dollar a ton. That is about the way of reckoning it when rates are running normally. On long routes it is something better than that. On a sailing route between San Francisco and Liver-

pool or Portland and Liverpool on wheat it is, say, a third of a mill per ton per mile. If you can save 500 miles, you save a sixth of a dollar on every ton of freight that is going through there. If it is 7,000,000 tons, that is \$1,200,000 a year. Now, you have got \$10,000,000 capital to your credit on account of saving this 500 miles, and you have got \$1,200,000 a year in saving on the total traffic on the cost of running it by the shorter route. That is an offset against the excessive estimates for cost of operation and maintenance.

It is material from another standpoint. Take a map of the world here, from which I prepared this sketch two or three years ago. Here is the equidistant line.

The CHAIRMAN. Where is that?

Mr. COOLEY. That is Australia.

The CHAIRMAN. Australia is equidistant line between the Suez Canal and the isthmian canal?

Mr. COOLEY. From Liverpool by Suez or the Nicaragua.

The CHAIRMAN. Where does that line run?

Mr. COOLEY. It runs from the east coast of Australia clear up outside of Japan. That is equidistant from Liverpool by Nicaragua or by Suez. Here is the line that is equidistant by the two routes from New York. It runs near the west coast of Australia and east of Borneo to the island of Hainan. Here is the line that is equidistant from the middle of the Atlantic, you may say, between the two.

The CHAIRMAN. Those lines take in the length of Australia?

Mr. COOLEY. Yes; and the coast from the island of Hainan to the Gulf of Tartary, including within the limits the whole coast of China, Japan, the Philippine Islands, Australia, and New Guinea. That is the competitive zone between the Atlantic coast of the United States and the Atlantic coast of Europe. If we build the Nicaragua Canal we are in that zone. If we make the canal route 500 miles farther from that zone we are not in it so hard, and if we do not build any canal you are not in it at all. The other fellow covers it. I should imagine that the other fellow from the other side was not overanxious to have us build any canal.

The CHAIRMAN. That is, the Panama man?

Mr. COOLEY. No; I am speaking of the general man in Europe.

The CHAIRMAN. The Suez man.

Mr. COOLEY. Yes; it is letting American competition into a trade that is practically controlled by the people who can afford to run via the Suez Canal.

The CHAIRMAN. Through Nicaragua we cross the zone of equidistance and reach the coast of Asia?

Mr. COOLEY. We can reach farther; get a wider zone.

The CHAIRMAN. So that the Nicaragua route takes that trade, counting distance as the element of calculation?

Mr. COOLEY. It takes more of it; and if we could build that ditch at Tehuantepec we would take in a still wider zone in competition with Suez.

There is another point I should like to say something about. Statistics have been brought out about sailing ships by way of the Suez. The Red Sea is a dead sea upward of 1,100 miles long. No sailing ship ever went through it any quicker than it gets through by way of Panama. The Mediterranean Sea was never a reliable sea. Even in the days of the Greeks and Carthaginians they propelled boats, not wholly by sails, but relied on oars. The winds are not reliable. So

when a man says that there are no sailing vessels using the Suez, why you will understand from what I have just told you that the conditions are impossible. There are some sailing vessels that go around the Cape of Good Hope from New York. A man starts out from New York with a sailing ship, and he comes away down here by the Cape Verde Islands, and it will depend upon the season of the year whether he goes to China in an old clipper ship by going around Good Hope or by going around the Horn. In certain seasons of the year it pays him to take the longer route. It depends upon the winds and things of that kind.

The CHAIRMAN. Quicker around the Cape of Good Hope?

Mr. COOLEY. When he gets out into the middle of the Atlantic, between Africa and South America, it is a question of choice then which way he goes, according to conditions.

The CHAIRMAN. Depending upon the seasons?

Mr. COOLEY. Depending upon the seasons. I think you would get some very fruitful thought out of this subject if you would get hold of some old-fashioned sailing master who is familiar with these facts.

The CHAIRMAN. We have been trying to get one. I believe you have got through with that topic, have you?

I wish now to ask you, as one having knowledge of the business of contracting on great works as well as a knowledge of the business of engineering on great works, is it your opinion that American contractors can be obtained to complete the Panama Canal at the price estimated by the Panama Canal Commission? Do you remember what their price is?

Mr. COOLEY. One hundred and forty-six million dollars.

The CHAIRMAN. Yes. Take all the conditions together, the health, and a man supplying his own labor, doing all the work and furnishing all the material.

Mr. COOLEY. I think you will be able to get men who will bid on the Panama Canal. I think you will get many more men of more mature judgment, and not so adventurous, who will bid on Nicaragua; and I think that of the class of men who ought to be considered as competent through experience to undertake this work, that they would feel that there was more money to be made in building the Nicaragua Canal at the figures of the Commission than there is to be made in the building of the Panama Canal at the figures of the Commission. What that difference would be I do not know. My judgment is that they would load the Panama bid at least 20 per cent as compared with the Nicaragua.

The CHAIRMAN. When you take the \$40,000,000 or the \$50,000,000 we will have to pay for the Panama Canal and for the Colombia concessions, and expend that on the Nicaragua route, then as to the balance of the work, up to the estimates of the Commission, would you think that American contractors would have any difficulty in taking the Nicaragua route in preference to the Panama route as it is?

Mr. COOLEY. Without question. If that \$40,000,000 could be spent with great intelligence and not in a rush, quietly expended, so as to get the full benefit of it, there would be no comparison in the two situations at the conclusion of that expenditure, in my judgment.

The CHAIRMAN. If I understand your testimony, then, Mr. Cooley, in a general way you are of opinion that the Nicaragua route is, after all, the cheapest route to construct?

Mr. COOLEY. I think that is true. I think that most of the doubts

in connection with the Nicaragua route are derived from the uncertainties of this preliminary work, and from the fact that the plan is not so well studied. I feel that it has been approached in a critical rather than in a constructive mood, and that when once this preliminary work is done, and a complete programme developed that is obvious on the ground to the man who can go over it in comfort, why, the attitude of the average man will entirely change.

Now, in speaking of men's minds being critical rather than constructive, I do not wish to show disrespect or make any invidious statement. There are very few engineers who have the fortune to be placed in the position where they can originate or devise a proposition. In ninety-nine cases out of one hundred engineers are called in like mechanics to execute some job that some other fellow has cut out. So I say there are few engineers that have the good fortune to be called in as anything more than modifiers or critics. This begets a habit of mind quite different from original thinking.

The CHAIRMAN. There is a choice of routes left open at Nicaragua, because no act of Congress has as yet adopted a particular route; but there is no choice of routes at Panama, if I understand it; that is, you could not change the line of the canal between Colon and Panama from where it is now, but in the choice of routes at Nicaragua there is a wide field between the canal of Childs and that of Menocal.

Mr. COOLEY. Yes.

The CHAIRMAN. And also between Menocal and the Isthmian Canal Commission a wide field of selection?

Mr. COOLEY. Well, I regard all propositions as intermediate between those two.

The CHAIRMAN. Is it not a great advantage to the Nicaraguan route that we have a choice of that kind, and that we can finally come to a conclusion and accept it as the best location there, with the assurance that any location that we may select will be a feasible and practical route, and will be to the advantage of the people and the Government of the United States?

Mr. COOLEY. I think so.

I wish to say here, if I have not said it, that I think the Frenchmen and I think also this Commission—and they have followed one of the plans of the technical commission substantially—have worked out the Panama route for about all there is in it, that they have about matured the best solution that can be made of that question there. I do not see how it can be bettered except in minor matters that will develop later. I do not think the Commission themselves claim they have exhausted the question at Nicaragua. They do say that it has not been so well studied, that the data are not so complete as they are at Panama, that it is less satisfactory in that respect, and they feel less certainty in their conclusions respecting Nicaragua than they do in regard to Panama. I think that ought to be said.

I would say for my own part that so far as the eastern division is concerned, I think the proper choice should be absolutely open and is absolutely open. I have my own ideas about the matter. I do not think the last proposition as given us was the best that could be made of it.

The CHAIRMAN. Well, that is a fortunate circumstance for us that we are in a situation where we can avail ourselves of any better plan that may be suggested for the construction of the Nicaragua Canal.

Mr. COOLEY. Yes; I think that if Mr. Morison was to put the same thought on this Nicaragua question that he has on the Panama, and had ignored the question of rock foundation as he did in his personal views upon the subject of the Bohio dam and proceeded to treat the Nicaragua question accordingly, I am confident that he would have reached a conclusion similar to what I have outlined as the one that I reached in 1898.

The CHAIRMAN. After the De Lesseps's plan or sea-level plan broke down or was abandoned by the French engineers and also by the American engineers as a possibility, from that time I understand it became a question of engineering experiments as to whether a lock canal could be successfully constructed over the Panama line?

Mr. COOLEY. Mr. De Lesseps and his coadjutors endeavored to maintain before the public the original sea-level proposition. So they proposed to construct this canal in steps, and cut out a step at a time, and eventually reach a sea-level canal. There was no final plan as to how that should be done further than was covered in the contract with Eiffel for some steel locks.

Let me say in that connection that the United States undertook an investigation of this matter in President Grant's day by the appointment of a commission consisting of Daniel Ammen, Chief of the Bureau of Navigation; General Humphreys, Chief of Engineers, United States Army, and Carlisle Patterson, Chief of the Coast Survey; that these gentlemen reached a conclusion and published that conclusion in 1876. I think, declaring unanimously in favor of the Nicaragua route as the most practicable route. That has stood as the judgment of the profession on that matter ever since, and it was advocated by our delegates at the conference at Paris, in 1879, I think, where we sent Mr. Menocal, and Mr. Ammen, and Mr. Johnson; that the English representatives and Russian representatives cooperated, and it was admitted generally that the Nicaragua route was the best route for a high-level canal; and the conference would have so decided, but as the matter progressed De Lesseps came before the conference with the proposition that this must be a sea-level canal, and on this condition the vote was for Panama, with a large number of the foreign delegates not voting. That is the history of the matter. That judgment stood on its merits as the judgment of American engineers until this last report.

Now the Frenchmen never even claimed that their route was suitable for a high level canal in comparison with Nicaragua until as a later proposition it became necessary to save their bacon by building a lock canal. There were good reasons for the American people entertaining a preference for Nicaragua, because that is the unbroken decision on the matter as the results of all investigations.

The CHAIRMAN. For a great many years.

Mr. COOLEY. Ever since 1876. I personally can see no reason for changing that judgment now.

The CHAIRMAN. When the New Panama Canal Company was organized it was stated in their statutes that it was for the purpose of experimenting to determine whether they could build a lock canal. This is true, is it not?

Mr. COOLEY. Yes; substantially, as I understand it. You refer to this provisional company?

The CHAIRMAN. Yes; what they call the Panama Canal Company.

Mr. COOLEY. Which made the contract with the liquidator?

The CHAIRMAN. The one which at present has control of it.

Mr. COOLEY. I do not know what recent powers they have acquired. Originally their intention was to constitute a provisional company to make experimental works, to organize the technical commission, to decide upon a plan, and at the end of a certain time to form a final company for the construction of the canal.

The CHAIRMAN. Having in the meantime submitted it to an international commission?

Mr. COOLEY. Yes; that was the contract with the liquidator originally; how much it may have been changed since then I do not know.

The CHAIRMAN. Therefore, if I correctly understand the situation, the lock canal at Panama was an engineering experiment put on foot by this New Panama Canal Company?

Mr. COOLEY. No; the old company changed its plans to that basis before it went into liquidation. That was the last straw. After they found that they could not raise any money, and it was reported that they had spent so much money and had not succeeded in building a canal, they said, "Gentlemen, this is a harder proposition than we had anticipated; but we can get ships across there with the aid of these steel locks of Mr. Effel in a certain length of time, for a certain amount of money." And they proceeded to get more money on that basis, and they said, "We will cut this down in steps, as we are able, until we finally get the ultimate designs, out of the earnings." That was done by the old company.

The CHAIRMAN. And the new canal company was then organized to conduct that as an engineering experiment?

Mr. COOLEY. Well, the scheme of a lock canal was a scheme of the old company before it went into liquidation.

The CHAIRMAN. And the new company was organized to execute it?

Mr. COOLEY. The new company was virtually organized to make final surveys and final plans and to do a certain amount of work for the purpose of determining the unit prices.

The CHAIRMAN. From that time to this has that Panama route through which it is proposed to build a lock canal been in engineering contemplation, still an experiment?

Mr. COOLEY. Well, I can not say. As I looked over the plans at Panama early in 1898, as they were outlined by the technical commission, I saw no insuperable difficulty in carrying out some one of their plans. They had two or three variations, one of which was substantially the present proposition.

The CHAIRMAN. You saw no insuperable difficulties?

Mr. COOLEY. No.

The CHAIRMAN. But still you saw great difficulties, if I understand it?

Mr. COOLEY. Well, I then had the same idea of a dam at Bohio that I had for Nicaragua, that it was perfectly feasible, and I am very much gratified that Mr. Morison has undertaken to champion that view. I thought it was perfectly feasible, with the enormous amount of material to be taken out of the Culebra cut. With that amount of material you could make a mountain. There is no insuperable difficulty in creating that lake there. At least, I do not think there is. It is a big engineering proposition, but I see no reason to fear that it would not be successful.

The CHAIRMAN. As an engineer you reach a conclusion about it that you are satisfied to stand on?

Mr. COOLEY. Yes.

The CHAIRMAN. Now, how many of these doubts and difficulties, if any, exist on the Nicaragua route?

Mr. COOLEY. Why, there is nothing about the matter as I have outlined it about which I have any doubts. A man in the face of a new problem feels, I imagine, as a general feels in the face of a battle; he does not like it, but he is up against it and he has got to fight it out. So, in regard to my mental attitude on the Nicaragua route, I have not nearly as many doubts about the building of a canal at Nicaragua as I had about the Chicago canal before we had actually let the contracts.

The CHAIRMAN. And having successfully completed that you have no doubts about the Nicaragua route?

Mr. COOLEY. They are much less than they were at that time in regard to the other enterprise. Now, there are no two great problems that are alike. There are no precedents, you might say, that will control, or that are alike, in the two cases. The problems are both unique, and each has got to be solved on its own basis. It has got to be solved much in the same attitude as you meet your physician. You are not so much concerned as to what school he belongs to as you are that he will mix a proper amount of brains and experience with his prescription. And that is all there is to that question. You have got to get men who have the experience and capacity for organization and who are in the habit of taking hold of new problems and solving them and not raising doubts about them.

The CHAIRMAN. If you were estimating the cost of operation and maintenance of the Panama Canal, you would take into consideration the state of health on that line?

Mr. COOLEY. Surely; you would have to.

The CHAIRMAN. And you would include also in that the population there as well as the operatives upon the works?

Mr. COOLEY. Well, in the construction period a very large item has got to be set aside for policing and sanitation, and we usually reckon that at 2 cents per capita per day—something like that. It would probably be 5 to 7 or perhaps 10 cents per capita per day down there. You can not tell.

The CHAIRMAN. That is the engineering estimate?

Mr. COOLEY. Yes. For marine-hospital service you collect 50 cents a month from each of your sailors, to care for them in the ports of the world. That amount is taken out of the wages, but you can not do that in that country. You have got to take care of the situations. You have got to view it as a sanitary question, and handle it with the rigidity of a czar. You can not afford to have any suspicion of a condition existing as bad as afflicted our army at Santiago; you can not afford even to have it as bad as existed in our camps near Chattanooga, without great risk of destroying the morale and the ability to secure skilled men and labor at reasonable wages.

I feel a kind of indignation when I hear people talk flippantly about this health question. I remember that the army, the crack service of the United States, with selected lives, were not able to do as well in Cuba or as well at Chattanooga, right in our own country, as we did on the Chicago Drainage Canal with 8,000 hoboes drifted in from all

creation. There we had as good a condition of health as in the best wards of Chicago. The health question was one that I went into deeply, and I think I can say justly that through my initiative in that matter and through the cooperation of the State board of health of Illinois that for the first time in the history of great public works we produced an ideal condition of health.

The Chicago drainage enterprise represented about 8,000,000 days' labor. You are figuring on at least 20,000,000 days' labor in Nicaragua. You get an idea of the force concentration involved; that is, I am speaking now of pay-roll days. You will have from two to four people for every pay-roll day, in various capacities, wives and hangers on and men who do not work, but who will be in the country. They have got to be taken care of, supervised and policed, taken care of almost like children. Now 8,000,000 days' work represents 8,000 men for a thousand days, and we did practically run 8,000 men there for about three years, or a thousand working days.

In that connection I would say that the labor cost on that work was about 56 per cent of the total. The rest represents supplies, materials, installations, profits, administrations, and things of that kind. The labor costs in Nicaragua will be less than that. A larger proportion of skilled labor and a larger proportion of machinery will be used. There is an enormous quantity of dredging there as compared with what we had at Chicago, and that is a fortunate item, because that is work that can be done aboard ship, as it were, so that you are more independent of climatic conditions. So the labor question will not cut so much of a figure in proportion.

Our work at Chicago probably ran 15 per cent for installation. At Nicaragua it will run much higher than that.

All of those elements have to be figured out to go about this work intelligently. You have got to figure out the amount of coal. There will be one to two million tons of coal to be taken to Nicaragua, and two to three million barrels of cement, and more than 10,000 tons of explosives. You have to get a few fundamental supplies of that kind, and you have to know where they are to come from.

The CHAIRMAN. The question has been raised in these examinations as to whether the Chagres River was a silt-bearing river. What was your observation upon that, if you made any?

Mr. COOLEY. It never occurred to me that there could be any question about that, because we saw the bars in the canal. We saw where it had produced flood plains, and there is a flood plain with a slope from Matachin down to the sea. A man does not have to look at the Chagres River. He can infer it from looking at the profiles, that it is a silt bearer. On the opposite side it is silt bearing. All the geological formations constitute silt-bearing streams. It probably runs clear at certain seasons of the year.

The CHAIRMAN. When there is no water in the stream?

Mr. COOLEY. Not very much, when the water comes largely by percolation.

The CHAIRMAN. I asked the question because I was surprised that anyone should say, when the channel has filled up with silt almost its entire length, with the dredging on both sides, that it was not silt bearing, or that the streams that ran into the bed of the canal were not silt bearing.

Mr. COOLEY. All that country has been through changes in base

level, as they speak geologically, clear back to Cretaceous times, through the Tertiary, and the change in its level that occurred prior to its present conditions was evidently of this character, that the land was lowered perhaps a hundred feet, leaving deep estuaries in from the sea. Where these estuaries have not filled up, where they have had no stream tributary to them, they constitute the natural harbors. Where a stream has come into them they have all filled up since that period. There was a sea estuary, no doubt, extending in, perhaps, to Matachin, and perhaps farther, for aught I know.

The CHAIRMAN. The Chinese have maps that show a channel through?

Mr. COOLEY. Mr. Hill, in his geology, concluded that may have possibly been in middle Tertiary times, and there are mussel shells and some shellfish that are practically identical on both shores; and so he concludes that there may have been a shallow sea connection for a limited period; but probably not in recent geological times has there been any connection between the two oceans. Some geologists have assumed that there has been no such connections between the two oceans since Devonian times.

Professor Cope has called attention to the fact that the mammalia of North and South America are affiliated, whereas the marine life of the opposite sides of the isthmus are not so well affiliated, indicating a land connection indefinitely remote in the past.

The CHAIRMAN. The finding of shark's teeth in one of the pits in the Culebra cut would indicate, I suppose, that there was a time when there was a Cretaceous formation there, without the superimposed Tertiary.

Mr. COOLEY. That is probably what the backbone is through there. We know that more primitive rocks are found in Guatemala and in the high land at the root of Yucatan. This is the only place in that latitude that we know of where the rocks back of the Cretaceous come to the surface.

Here is a thought apropos of the shark's teeth. Dr. Hayes suggests that Lake Nicaragua was at one time an arm of the Pacific, and Toro or Castillo was the divide. That arm of the sea was a portion of the present Bay of Fonseca. There comes along a change in base level, accompanied with the enormous eruptive disturbances, probably of the Ometepe period, exhibited by that group of volcanoes west of the lake, and closes across that whole bay, forming Lake Nicaragua. It proceeds to empty down the other way to the east. It shuts in that bay a lot of Pacific sharks, and as the water freshens they become fresh-water sharks, and they are there now. They are Pacific sharks, not Caribbean sharks.

The CHAIRMAN. Not Caribbean?

Mr. COOLEY. No; they are affiliated with the sharks of the Pacific. So you may say, at least, that the sharks were existent at the time that Lake Nicaragua was formed, and of a type affiliated with the present type now existing in the Pacific.

The CHAIRMAN. You have spoken of Ometepe, one of the volcanoes on the island of that name.

Mr. COOLEY. There is one, Mosaya; another, Mambaco, and also Monotombo, and many old cones.

The CHAIRMAN. They are grouped together in the lake?

Mr. COOLEY. West of the lake; there is another on Ometepe Island, called Madera.

The CHAIRMAN. Is there any sign of recent volcanic disturbances in those uplifts?

Mr. COOLEY. I looked particularly for that. There are discoverable cracks in the adobe buildings, due to earthquakes, which I found at Rivas. I could not discover around Lake Nicaragua any evidences that there had been any warping of the earth which has changed the present level of Lake Nicaragua or its shores since it was formed. I do not think there has been. I feel safe in this statement, that since the formation of Lake Nicaragua there has not been a disturbance on that route equal to the New Madrid earthquake of 1811 (December 16), shocks continued for three years, in northeastern Arkansas and southeastern Missouri. I was in that country when I was on the Mississippi River surveys in 1878-79, and there still exists sunken lands and lakes and changed rivers that were produced by that earthquake, that everybody recognized as having been so produced. There has not been a disturbance in historic times in Nicaragua that has produced phenomena as radical as that in character, and probably not since the lake was established at the present level. It has been stated, and I think probably it is true, that there have been no earthquakes in that country in the historic period as severe as the Charleston earthquake.

The CHAIRMAN. Ometepe, which is a little island filled with volcanoes that I think are extinct, in Lake Nicaragua, is referred to by some medical authorities as being a very excellent site for hospitals and for sanitariums.

Mr. COOLEY. I think it undoubtedly would be.

The CHAIRMAN. For navigators and sailors?

Mr. COOLEY. I think it undoubtedly would be ideal; anywhere on that western division is a fine country. Up there on the Brito headland, nearly 400 feet above the sea, is an outlook that is magnificent.

The CHAIRMAN. I believe that used to be a place of resort for the coast people?

Mr. COOLEY. Yes; so I understand. I think anywhere around there the health conditions are excellent.

I want to add another statement, and that is in regard to the cost of maintenance of these canals. The Commission have referred to various ship canals. That may be all right as to locks, but we have better data in this country in regard to the cost of maintaining these intermediate channels, like the channels in the lakes, miles of which in the Great Lakes are under water, such as the approaches to the harbor of Toledo, the connection between Lake Huron and Lake Erie, the connection between Lake Huron and Lake Superior, and the ship channel in the St. Lawrence from Montreal to Quebec, where there are 40 miles of under-water channels which are navigated by the largest steamers of the Allan Line, that go up to Montreal without towboats at all, with only a small depth of water under their keels.

Then there are the approaches to the harbor of Baltimore, where you go for more than 20 miles guided by buoys, without the necessity of tugs; also in reaching Philadelphia by the Delaware River, and at Savannah. These are the real precedents as to the cost of maintaining these channels; as compared with the situation there, more nearly alike, more akin.

Then another thought on the towing question. It was my thought when I was considering this matter from a commercial standpoint that the canal management could afford to provide the necessary tugs to do

this towing of sailing vessels as a gratuity, getting their pay out of the tolls. It would take a towing boat such as we have on Lake Michigan not to exceed two days to tow an ordinary vessel through the Nicaragua Canal.

Our tugs at Chicago sometimes go halfway to the Straits of Mackinac, and lie off a harbor to pick up a lumber schooner, and tow her more than half the length of Lake Michigan, in order to get the towing bill in the port. Probably for a couple of hundred dollars any vessel could be towed across. It is not a large or material item. I can hardly entertain the thought of a canal being constructed so that a steamship can not go through with its own power. If I should be guilty of designing such a canal I should wish to begin over again and see if I could avoid it and meantime say as little about it as possible. It is presumed, also, that the management would have a special corps of trained pilots to take charge of vessels from sea to sea, the same as they have for the St. Lawrence between Quebec and Montreal, and this question of insurance that has been raised would probably settle itself in the same way. To those familiar with the handling of craft in our lake channels, it is difficult to understand how these questions should be raised except to point out the remedy for possible faults in design and in management.

The committee (at 2 p. m.) took a recess until Tuesday, February 25, 1902, at 10.30 a. m.

STATEMENT
OF
J A M E S P A G E

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL,
TURNER, AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Wednesday, February 19, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senator Morgan (chairman).

Also Senators Hawley and Millard, members of the committee.

Mr. James Page appeared, and was duly sworn by the chairman.

STATEMENT OF JAMES PAGE.

The CHAIRMAN. You are hydrographer in the Navy Department, I believe, are you not?

Mr. PAGE. I am not hydrographer; I am employed in the Hydrographic Office as a meteorologist.

The CHAIRMAN. Some charts have been sent here to us from the Department that we do not fully understand, because we are not acquainted with the technicalities that are used to describe things, and I want you to give us an explanation of those charts. Just unfold them there, if you please, and explain them, particularly with reference to the extent of the calm belt, the doldrums, as they are called, both latitudinally and longitudinally, off the coast of Panama, and the persistency of those calms—whether they cover a long or a short space on the ocean and are permanent natural conditions.

Mr. PAGE. Yes.

The CHAIRMAN. You can explain those things in your own way. Try to explain them so that nonprofessionals can understand them.

Mr. PAGE (referring to the charts). These are what are called pilot's charts. They give navigators, principally of sailing vessels, an idea of the prevailing direction of the winds in the various parts of the ocean, the frequency of calms, the direction of currents, and other features.

For the purpose of constructing these charts the ocean is supposed to be divided up into squares, the side of each square being 5° of latitude and 5° of longitude; that is, each one of these larger sections contains four squares. It (the larger section) covers 10° of longitude and 10° of latitude. The square, which is the unit of surface, is 5° on a side. All of the observations for any one month within that square are collected, no matter what the year may be, and are tabulated, the result giving the statistics for that particular square for the given month.

Now, first, with regard to the winds, the frequency of wind of a given direction is shown by the length of the arrow. For instance,

here in the trades, where all of the winds come from the east-north east, northeast, and so on, the length of this arrow here will represent about fifteen days in that month.

The unit of measurement is 15' of longitude, the scale being shown on the upper and the lower margin of the chart; that is, a degree of longitude (60') is four days. The mariner, in order to find the frequency of a given wind, simply takes his dividers and measures off the length of the arrow and carries it down to the longitude scale on the margin. The whole length of the arrow, measured on the longitude scale, will then give the number of days. For instance, this arrow [indicating] is about sixteen days long, I should say. That means that winds from the east northeast prevail during sixteen days of this month of December in that square.

The CHAIRMAN. Now in this way the wind currents have been reduced, I suppose, to such a degree of certainty that navigators can rely upon them for the power to sail their ships?

Mr. PAGE. In certain parts of the ocean they are. In other parts of the ocean the number of observations is too small for us to base reliable conclusions. Of course, these observations are mainly taken along the principally traveled sailing routes. For instance, here is the sailing route from San Francisco to Australia. Now along that line we will get quite a number of observations; but 10 degrees on either side of that line we will obtain no observations whatever. For instance, in that square [indicating] there is no arrow drawn, which signifies that the number of observations within that square has not been sufficient to furnish a reliable conclusion.

The CHAIRMAN. A navigator starting for Australasia would take the line which is indicated as containing the most steady and the strongest winds?

Mr. PAGE. Yes; that is the way we lay these lines out. We lay that line out, taking into consideration both the strength and the direction of the wind, and the distance to be traveled. We look over that line and say, "That is the best route for that man to travel, in order to reach Australia."

The CHAIRMAN. So navigators, accepting your calculations and those of the other establishments in the world, pursue these routes?

Mr. PAGE. Yes; very largely.

The CHAIRMAN. And seldom deviate from them?

Mr. PAGE. English and American navigators adhere quite closely to the routes which are laid down on the pilot charts. German navigators place more reliance upon the reports of their own hydrographic office, which lay down somewhat different routes occasionally from those which are laid down by the American Hydrographic Office.

The CHAIRMAN. But I suppose upon all of the great commercial routes of travel the different enlightened nations of the earth, the maritime powers, agree substantially upon the location of the routes.

Mr. PAGE. Yes, of course; all the information is published, and it is all discussed.

The CHAIRMAN. Now, having made that explanation, we will come to a little more specific application of it—to the question of navigation off the coast of Panama.

Mr. PAGE. Yes, sir.

The CHAIRMAN. I notice on some of these charts there is quite a wide area in which the arrows are omitted and circular dots are put in; or,

if they are not omitted, the arrows are very short. What does that signify?

Mr. PAGE. If the arrow is missing it signifies that the number of observations is not sufficient to base a reliable conclusion upon them. For instance, in these squares [indicating a point on the chart] the absence of the arrows would show either that there were no observations at all in those squares or that the number was too small for us to deduce a satisfactory conclusion. A very short arrow shows that the winds coming from that direction are relatively infrequent.

The CHAIRMAN. Why should that occur in any area of the ocean as large as that, that no observations should be made?

Mr. PAGE. There is no well-traveled route passing through that square. There is no special port in that section for which vessels make—that is, American and English vessels, which are of course our mainstay in the construction of these charts. But now here is a point of difference: Many German sailing vessels go there [indicating]. There is quite a considerable German traffic to the ports of Corinto and Punta Arenas. Indeed, the traffic to those two ports is mainly carried on by German vessels, as in fact is the traffic to the whole west coast of Central America, and they have to go to one of these ports or the other, either Corinto or Punta Arenas, in order to get clearance papers, so that after taking cargo at any Central American ports they go to Punta Arenas or Corinto before sailing.

The CHAIRMAN. How far to the northward of Panama is Punta Arenas?

Mr. PAGE. Following the coast line, it would be about 400 miles.

The CHAIRMAN. How far would Corinto be?

Mr. PAGE. Corinto would be about 600 miles, I should say. Brito lies on the coast between Punta Arenas and Corinto.

The CHAIRMAN. Are there winds at Corinto and at Punta Arenas that justify sailing ships in going in and out?

Mr. PAGE. At all times of the year they meet with an enormous percentage of calms there.

The CHAIRMAN. Between Corinto and Punta Arenas?

Mr. PAGE. Yes, indeed; along that whole coast.

The CHAIRMAN. What is the percentage of calms below that, in the direction of the Bay of Panama and off the Bay of Panama?

Mr. PAGE. From the equator to latitude 5° north the calms are not nearly so frequent. They increase in frequency as we come northward up to about 12° , where, I should say, the line of maximum frequency lies. That line does not run due west, but inclines out from the coast in a west-southwesterly direction [indicating]. That is, the region of most frequent calms would be something of that shape. (See diagrams.)

The CHAIRMAN. What would be the area of that region of calms?

Mr. PAGE. It is ordinarily described as a triangular region which starts from the neighborhood of Cape Corientes here, and runs out so, something like that. [Indicating.]

Senator MILLARD. It does not spread all over?

Mr. PAGE. Oh, no; not at all. It never reaches beyond the meridian of 120° . It varies somewhat from month to month.

Senator MILLARD. Why is it that it takes such a peculiar shape as that? Is there any known reason for that?

Mr. PAGE. It is a question of the physics of the atmosphere. The

winds of the earth circulate around areas of high barometer. Here, in latitude 30° to 40° north, longitude 140° to 150° west, is the area of high barometer for the North Pacific Ocean. The winds of the earth blow outward from this area of high barometer to the areas of low barometer, just as the water runs down hill. At the same time they circulate around in the same direction as the motion of the hands of a watch. If you will notice these arrows on the pilot chart giving the direction of the prevailing winds, you will see they all circulate around in this direction. To the southward of the area of high barometer the air moves from east to west; to the northward of this area from west to east. [Indicating.] So that the winds blow around this area, and at the same time outward toward the areas of low barometer. The force of the wind depends upon the rate of change of the pressure, which is called the barometric gradient. Where this is steep the winds are strong; where it is gentle they are light. Where it is absent and the atmospheric pressure is uniform calms prevail. This is the case in the region under consideration.

The CHAIRMAN. That might be described then as a sort of dead center of the wind?

Mr. PAGE. That is exactly so.

The CHAIRMAN. And it is in the form of an ellipse?

Mr. PAGE. In the form of a triangle, the base of which rests on the American coast and the vortex of which is found in latitude 7° north, longitude 120° west.

The CHAIRMAN. Is that a permanent condition of the atmosphere there?

Mr. PAGE. Very nearly. From December up until April, in those regions, there is some evidence of the northeast trades blowing, but from May probably to November the percentage of calms in there is very large indeed, probably 30 per cent, or certainly 25 per cent.

The CHAIRMAN. How far to the westward would a ship ordinarily have to go to escape or to get outside of this calm belt?

Mr. PAGE. From what point, sir?

The CHAIRMAN. From Panama.

Mr. PAGE. From Panama, if she sailed between May and November or May and October, she would get southwesterly winds almost immediately upon leaving Panama—probably 100 miles to the southward—but upon striking these southwesterly winds, in order to get anywhere she would have to stand across to the westward probably to the meridian of 100 degrees.

The CHAIRMAN. That would be about how many miles—nautical?

Mr. PAGE. It would be about 800 miles. That is, it would not be calms, but it would be beating against head winds—that is, for the voyage outward bound from Panama. Of course those winds would be favorable to a vessel approaching Panama.

The CHAIRMAN. So that for a sailing vessel to reach San Francisco or Santiago or any point in Oregon or Alaska, or anywhere up there, it would have to beat out or be carried out in some way to this point 800 miles westward before she would receive favorable winds for getting up the coast?

Mr. PAGE. Before she could start upon her voyage up the coast.

The CHAIRMAN. Before she could really start on her voyage?

Mr. PAGE. Yes.

The CHAIRMAN. Have either of you gentlemen anything further you wish to ask Mr. Page?

Senator HAWLEY. I have nothing.

Senator MILLARD. What I understand is that a ship in order to get up this coast will have to go away out here. [Indicating a point on the chart.]

Mr. PAGE. Yes; a sailing vessel could not beat up along the coast from Panama.

Senator MILLARD. Any ship, then, starting to make any of these northern ports would labor under great disadvantage?

Mr. PAGE. Would labor under great disadvantage in coming from Panama.

Senator MILLARD. Would she not, if coming from any other country, just the same, if she wanted to get into those ports?

Mr. PAGE. It is a very tedious voyage, indeed.

Senator MILLARD. From any place along this coast, I suppose there would be the same difficulty?

Mr. PAGE. It is very difficult to approach and very difficult to leave.

Senator MILLARD. Would it be the same from Brito that it would from Panama?

The CHAIRMAN. What about the trades at Brito?

Mr. PAGE. There is precisely the same condition at Brito as at Panama. For a vessel bound in to Panama or to Brito, there would be less difficulty.

The CHAIRMAN. And how would it be going toward San Francisco?

Mr. PAGE. Toward San Francisco a vessel would probably have less difficulty leaving Brito than she would leaving the other port.

The CHAIRMAN. On account of the trades blowing through that depression, over Lake Nicaragua?

Mr. PAGE. The distance is so much shorter leaving Brito than leaving Panama; that would be one advantage. Leaving Panama she would have to stand to the southward, certainly as far south as the equator.

The CHAIRMAN. I did not inquire of you about that particularly, because all the testimony we have had indicates that the trades blow perennially through this depression of Lake Nicaragua over Costa Rica and Brito.

Mr. PAGE. The northeast trades are felt, especially from December to April. Just off Cape Blanco, in the neighborhood of Brito, they apparently blow across the country from the Caribbean Sea; but farther out to sea they are not felt.

The CHAIRMAN. Out here [indicating]?

Mr. PAGE. They do not seem to blow down to this region at all.

The CHAIRMAN. They turn to the northwest?

Mr. PAGE. They seem to die out; that is, they are very light indeed.

The CHAIRMAN. After you leave the coast they get light?

Mr. PAGE. Yes; very light indeed.

The CHAIRMAN. Then what winds do you have to carry you up the coast to San Francisco?

Mr. PAGE. Leaving from what port, sir?

The CHAIRMAN. Leaving from Brito.

Mr. PAGE. Leaving from Brito, you would stand out toward the westward, in that direction. You see that long arrow represents the

trades blowing across there. That means that the winds during that month are northeast—just off the coast; but you will see the winds are only of the force of two, which is very light wind, indeed. A vessel under those conditions would stand out westward from Brito, probably to about 115° west, and then stand to the northwestward under the influence of the northeast trades up to about this point [indicating a point on the chart], and then stand in for San Francisco.

The CHAIRMAN. So that a vessel from Brito would reach the trades at what distance from the coast?

Mr. PAGE. A vessel from Brito would reach the trades, say, 400 miles from the coast.

The CHAIRMAN. And from Panama she would reach them in 800 miles?

Mr. PAGE. She would cross the equator. She would start on her northward voyage at a point about 800 miles from Panama. She would reach the southeast trades at an earlier date, which in this case would be southwest winds, as I should have explained. She would have to stand out to the westward and to the southward before she could start on her northward voyage.

The CHAIRMAN. You mean a vessel from Panama?

Mr. PAGE. A vessel from Panama.

The CHAIRMAN. That would be about 800 miles?

Mr. PAGE. Yes.

The CHAIRMAN. But a vessel from Brito would strike the trades that make up the coast, or strike winds that make up the coast, at a distance of 400 miles from Brito?

Mr. PAGE. She would strike winds under which she could sail up the coast probably at a distance of 400 miles.

The CHAIRMAN. Winds upon which she could project her voyage and hold the wind until she got in?

Mr. PAGE. Yes.

The CHAIRMAN. I suppose that a vessel going out from Brito would strike the same winds that the German ships have that come in at Corinto and Punta Arenas?

Mr. PAGE. Yes.

The CHAIRMAN. Those are the winds you refer to?

Mr. PAGE. They lead off of the shore from ports here within 150 miles of each other.

The CHAIRMAN. And at Punta Arenas and Corinto the Germans do the trading?

Mr. PAGE. Yes.

The CHAIRMAN. They have a monopoly of the trade?

Mr. PAGE. Yes.

The CHAIRMAN. And no other ships visit those ports as a general thing?

Mr. PAGE. Very few English or American vessels. Very few of those German vessels come up the American coast, however. They are all bound around the Horn from Europe to these points, and from these points back to Europe.

The CHAIRMAN. Please state what you know as to the proportion of sailing vessels on the Atlantic and the Pacific—the proportion between sailing vessels and steamships now engaged in that commerce?

Mr. PAGE. With regard to navigation by sail being superseded by steam, the opinion ordinarily held is not wholly true. On the

Atlantic side of the United States there will ordinarily be met five steamers for one sailing vessel. On the Pacific these conditions are completely reversed, five sailing vessels for one steamer being the rule. The deciding factor will be the ease with which coal is obtained. Where coal is abundant steam navigation will crowd out the sailing ship. Where coal is scarce and expensive the sailing ship will remain in favor. Even on the Atlantic the sailing ship is still employed where speed is not urgent. The Standard Oil Company, for instance, has lately had built a fleet of four-masted steel sailing ships, of 3,000 tons each, for the transportation of its specialty.

The Committee (at 11.15 a. m.) took a recess until Friday, February 21, 1902, at 10.30 a. m.

S. Doc. 253—pt. 3—19

**REPORT OF WINDS AND WEATHER ON PACIFIC
COAST OF CENTRAL AMERICA.**

HYDROGRAPHIC OFFICE.

REPORT OF WINDS AND WEATHER ON PACIFIC COAST OF CENTRAL AMERICA.

WIND AND WEATHER ALONG THE WEST COAST OF CENTRAL AMERICA.

The following eleven pages are extracts from the Sailing Directions (H. O. Publication No. 84, and a revised copy now in press) published by the Hydrographic Office, Bureau of Equipment, Navy Department.

The general system of winds of the North Pacific will be best understood by referring to the high-pressure system, which is constant between the coasts of California and Oregon and the Hawaiian Islands. Around this system the winds are anticyclonic, and the consequence is that the winds are as described below. The small variations are doubtless due to the shifting of this high-pressure system with the seasons, as, although it is constant, the area is liable to modification.

Across nearly the whole of the North Pacific Ocean, between the equator and the parallel of 20° N., there is generally found a wind from a direction varying between N. and E. This wind from its soft, mild nature and its striking resemblance to the wind found in the same latitudes of the Atlantic, has been known from the earliest ages as the northeast trade wind. It is, however, by no means so strong or steady as the trade wind of the Atlantic; its limits are narrower, and its direction is more easterly, inclining at times even to the S. of E.

Toward the American coast the trade wind extends much farther north than in midocean; it is also more northerly in its direction, coming round often to N. and even to the W. of N. On the coast of California, from a latitude of 40° N. for 10° or 15° southward, a wind from NW., or nearly parallel with the coast, blows pretty steadily for the greater part of the year.

During the winter months this northwesterly wind is not found quite so far to the northward; but it stretches down the coast at that season, often nearly to the line, and pretty constantly as far as 10° or 15° N. In summer, on the other hand, it gives place in the lower latitudes to a southwesterly or a southerly wind. At Mazatlan and San Blas, for instance, the southerly wind begins in June and ends in October. Like the southerly monsoon, on the coast of China, it is accompanied by much rain, does not blow steadily, is interrupted by frequent squalls from different points of the compass, and generally winds up with a violent and dangerous storm.

Between the westerly winds and the easterly or trade winds there is an intermediate region where the wind has no very settled direction. This may be considered as lying for the most part between the parallels of 20° and 30° N. In the summer the trade wind extends somewhat farther to the N.; in the winter the westerly wind is found farther to the S.; but at all seasons there is between the two a space where the wind can not be in any degree relied on, where winds from opposite quarters, sharp squalls or calms, alternate in the most baffling succession. On this account ships going east or west should avoid trying to change their longitude between these parallels, but should keep to the northward or the southward of these limits, where they can almost count on having a fresh, fair wind.

It will be noticed, however, that this unsettled region does not extend across the Pacific from shore to shore. On the east, near the American coast, the northerly winds are felt far to seaward, for a distance which is perhaps on the average not less than 10° or 12° of longitude. On the west the alternation of the monsoons is clearly marked as far north as the parallel of 30° N., and reaches without any decided break into the line of the prevailing west winds.

Coast winds.—Between Cape Corrientes (latitude $5^{\circ} 30'$ N.) and Panama the prevalent winds are from the northward, with frequent squalls from the SW. between the months of June and December. In the Gulf of Panama the winds are regulated by the seasons; the prevalent wind is from the northward. In the fine season, commencing in December, the winds are regular and constant, bringing fine, dry weather. In April and May the northerly winds are less regular and have more westings in them, with calms, light sea and land breezes, with occasional squalls from the southwestward. In June the rainy season sets in, and the southerly winds become stronger—still the northerly winds occur at times—and vessels sailing from Panama at all seasons will generally have a fair wind until south of Cape Mala.

Between the Galapagos Islands and the coast westward of the meridian of 80° W. and south of the parallel of 5° N. the winds are between S. and W. all the year round, and except between the months of February and June they are of sufficient strength and duration to make navigation easy; but northward of 5° N. and between 80° and 110° W. is a region of calms and doldrums, accompanied by rains and squalls.

On the coast of Veragua, from Panama Bay to the Gulf of Dulce, the winds also depend on the seasons. Toward the end of December the northers set in; these are fine, dry breezes, generally beginning in the afternoon and lasting till midnight, blowing very fresh from NNE. to NNW., with a clear, cloudless sky, and the air so rarified that objects on the horizon are distorted and flattened. Generally they blow as a double-reef topsail breeze, but sometimes much stronger, obliging vessels to close-reef. During even the strongest of these breezes a dead calm often prevails 10 or 15 miles off land, the only indication of a gale blowing within a short distance being the agitation of the sea, which is raised in short, hollow waves.

Toward the beginning of April these northers begin to fail and are succeeded by calms and land and sea breezes, with occasional squalls from the SW. As April advances the squalls become stronger and more frequent, and in the beginning of May the rainy season is established and continues till November, during the greater part of which

S. and SSW. winds prevail, with bad weather, gales with thunder and lightning being frequent and at times violent.

From the Gulf of Dulce to the Gulf of Fonseca the winds still vary with the seasons, modified, however, by locality. Thus, for example, whenever northerly winds prevail they blow nearly at right angles to the direction of the coast; thus, off the coast of Nicaragua they blow from NNE. to ENE. and E. These breezes are called, locally, Papagayos. The prevailing winds, however, of the dry season, from January to April, are from SE. to NE.

The rainy season lasts from May until November, but at first only occasional showers are experienced, generally in the afternoon. Later in the season calms and southerly storms prevail, the rains fall continuously, while thunder and lightning are at times incessant. Commander Wood, R. N., says:

From May to November, which is the rainy season, the weather is mostly bad; gales from the W. and SW., with thunder, lightning, etc., being frequent, and at times violent.

Other authorities refer to gales from the SE. and S. as well.

From the Gulf of Fonseca to the Gulf of Tehuantepec the northerers are not met with till the latter gulf is reached, when they appear again under the name of Tehuantepecers and are more violent in character. Along that portion of the coast of Salvador, Guatemala, and Mexico where the mountains approach and even in some places form the coast line, the winds during the fine season (January to April) are the usual tropical land and sea breezes, the former blowing from NW., the latter from S., varying to WSW. and W. The other months of the year are marked by bad, stormy weather and winds from W. and SW., as on the Nicaraguan coast.

From the Gulf of Tehuantepec to Tejupan Point, as along the whole coast of Mexico, during the rainy season, from April to September, the weather is very bad; gales and strong breezes from SE. to SW. constantly occur, while squalls, accompanied by thunder and lightning, with heavy and almost incessant rain, characterize the season throughout. During the fine season, however, nowhere is weather so uniformly fine and uninterrupted as on this coast of Mexico; a regular sea breeze sets in about noon, beginning from SSW. to WSW. and getting more westerly as the sun goes down, decreasing with it and gradually sinking into a calm as the night closes in; this is succeeded by the land wind, which is less regular in direction and force.

When the coast trends northward again, as it does about Tejupan Point, northerly winds are again found, blowing down the Gulf of California, and are very steady during the fine season a few miles off the coast. A vessel taking advantage of these winds, and of the daily variation in their direction caused by the alternate land and sea breezes, can make her passage from this point to San Blas or Mazatlan, but it is always a tedious beat against a lee contrary current, with frequent calms.

Along the coast of Lower California, or from latitude 23° to 32° N., the wind is generally from between W. and N., but during the winter months, from November to April, that coast is subject to violent gales from the SE., which, as most of the bays and anchorages are open toward this quarter, are much dreaded. The gales are less frequent about Cape San Lucas, and toward the northern part of this coast they are more severe; they always give ample warning, however, of their

approach. In the summer season the only alteration is that the wind is more westerly in the mornings, and draws round with the sun as the day advances. The only way for a sailing vessel to make a passage up this coast is by standing off on the starboard tack; as the offing is gained the wind draws to the eastward, and having made her northing, she will fetch her port on the other tack.

PASSAGES.

PANAMA TO CENTRAL AMERICA.

Full-powered steam vessels.—Direct.

Auxiliary-powered and sailing vessels.—The passage to ports along the coast of Central America is slow and troublesome to a sailing vessel; advantage must be taken of every shift of wind to get to the northwestward. The currents will be with the ship as far as the Gulf of Fonseca, when the Mexican stream will be fairly met, and if bound to Acapulco or Mazatlan the passage may be better made by standing off from the coast after reaching Fonseca.

The return passage along the coast is much easier between December and May. Keeping in sight of the coast insures a fair wind the whole way. In other months of the year the coast should be avoided.

PANAMA TO SAN FRANCISCO AND FUCA STRAIT.

Full-powered steam vessels.—Direct as possible.

Auxiliary-powered steam vessels should stretch off on a W. by N. course, passing the meridian of Acapulco in latitude 13° N. The eastern limit of the northeast trade wind is uncertain, but it will generally be met with in about longitude 103° W.; that is, at about 300 miles from land. When first falling in with it the W. by N. course should be maintained, as by steering more to the northward the trade wind will be found to hang more to the north and northwest. The meridian of 110° W. should be crossed in latitude 14° N., after which steer to cross the one hundred and thirtieth meridian in about latitude 30° N., when steer northward until the westerly winds are reached, and then gradually edge away for the port.

Sailing vessels.—A vessel unaided by steam power will experience considerable difficulty and delay in getting out of Panama Bay on account of the light baffling winds and calms that are met with there at all seasons. Between October and April the prevailing wind in the gulf is from the northward; for the remainder of the year the wind hangs more to the westward, and land and sea breezes are felt, varied by calms and occasional squalls from the southwest. Northward of latitude 5° N., between the eightieth and the one hundred and tenth meridians, is a region of calms and light winds, varied by squalls of wind and rain; but southward of latitude 5° N., between the mainland and the Galapagos Islands, west of the meridian of 80° W., the wind is between S. and W. all the year round, and, except between the months of February and June, is fairly strong.

A sailing vessel should, therefore, at all seasons make the best of her way to the southward into the SE. trade wind; pass northward of the Galapagos Islands, keeping on the parallel of latitude 2° N. until the meridian of 105° W. is reached, when edge away to pass

westward of Clipperton Island, in the neighborhood of which the NE. trades will be met with, when stand to the northwest to cross the parallel of 20° N. in longitude 120° W.; thence, if bound to San Francisco, stand to northwestward as far as latitude 35° N. in longitude 135° W., but if for Fuca Strait keep on to the northwestward as far as 40° N. in longitude 138° W.; then haul in for the coast as the wind allows, remembering always to make the land northward of the desired port.

MEXICO TO CALLAO.

Full-powered steam vessels.—Direct.

Auxiliary-powered steam vessels should always approach the land near Cape San Francisco. Their steam power will help them both in the first part of the voyage and while beating up to Callao beyond Capes San Francisco and Santa Elena.

Sailing vessels.—The western route seems to be undeniably better from Mazatlan, San Blas, or Acapulco. If from farther south, Istapa or Realejo (Corinto), for instance, there may be some doubt as to which is the better route; but even then it would seem that the westerly passage is to be preferred. The SE. trade will be found to the southward of 10° N., when a vessel may haul up a little free on the port tack and pass a trifle west of the Galapagos Islands.

Vessels taking the inshore route can hardly expect to make the passage from San Jose de Guatemala to Cape Blanco in less than fifteen days, and the whole voyage to Callao in less than thirty-five days.

LOWER CALIFORNIA TO THE NORTHWARD.

All steam vessels, as direct as possible, keeping within 15 miles of land.

Sailing vessels.—The only way to make a passage from any part of this coast to the northward is to stand out to sea on the starboard tack until the variables are reached, probably in 130° W., and then make northing, as above directed. From July to January vessels may have to stand out as far as 140° W.

SAN DIEGO, SAN FRANCISCO, AND FUCA STRAIT TO PANAMA.

Full-powered steam vessels, as direct as possible.

Auxiliary steam-powered vessels should cross latitude 20° N. in longitude 109° or 110° W., and go down the Mexican coast with the prevalent NW. winds, steaming when becalmed. It will be to their advantage to cross latitude 10° N. in the neighborhood of longitude 90° W., but they will afterwards encounter SE. and S. winds, these being often variable and light. Steam must be used to reach Panama.

Sailing vessels making this passage between the months of December and May, inclusive, when the prevailing winds on the coast of Mexico are from the northward and the current favorable, should stand down the coast of California, keeping about 100 miles off, and at about 150 miles off the coast of Mexico, shaping a course to make the island of Jicaron, which is a good landfall for vessels bound to Panama from the westward.

Between the months of June and November, inclusive, when calms, variable winds, and oftentimes hurricanes prevail on the Mexican coast.

vessels should stand well out to sea after passing San Francisco, shaping a course to cross the equator in about longitude 104° W., thence standing on to the southward until sure of reaching Panama on the starboard tack.

EXPLANATION OF BASE CHART, SHEET 11.

NORTH PACIFIC OCEAN.

This chart shows the best sailing routes, as described in the extracts from Sailing Directions. It must be remembered that the region concerned is one of the most difficult in all oceans to deal with, and concerning which there is considerable contradiction among mariners and writers, and that "best sailing routes," under any circumstances, are necessarily not fixed lines, but the result of a tentative effort to arrive at the most advantageous routes, all circumstances considered.

One of the worst impediments in this region is the belt of doldrums (calms and light variable winds, interrupted by rain squalls) which lies between the belts of steadier and stronger winds that prevail in the trade-wind regions to the south and along the coast north of it. While it may be counted upon for a small proportion of northeasterly winds in the winter season and of southerly to southwesterly winds in the summer season, the breezes are at all times of little strength (mostly 0 to 4 on the Beaufort scale); they are the frayed edges, so to speak, of the trade-wind belts.

Therefore, as far as winds alone are concerned, the doldrums present an obstacle of calms and baffling winds, and sailing vessels should endeavor to go around rather than through it.

OCEAN CURRENTS.

Vessels bound out of Brito in the first half of the year will find a westerly current of 10 to 40 knots a day along the tenth parallel. A light, southerly current runs down the Mexican coast all the year. In the latter half of the year a northwesterly current will be found off shore near Brito of 10 to 25 knots a day. Farther out to seaward a westerly current is encountered along the tenth parallel; but in the summer months this westerly current will probably be found north of the fifteenth parallel.

In the vicinity of Panama in the first half of the year a southwesterly current sets toward the Galapagos Islands, and near the South American shore a current sets in toward Panama. The strength of this current is usually above 10 knots a day, and sometimes reaches 35 or 40 knots. In the latter half of the year the region between Panama and the Galapagos Islands is nearly all under the influence of a current setting toward the E. and NE. 10 to 40 knots a day. A faint current runs into Panama Bay on the east side and a stronger one sets out on the west side of the bay.

STATEMENT

OF

PROFESSOR EMORY R. JOHNSON

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON
INTEROCEANIC CANALS,

UNITED STATES SENATE,

CONSISTING OF

SENATORS MORGAN (CHAIRMAN), HANNA, MITCHELL, TURNER,
AND FOSTER OF LOUISIANA.

ISTHMIAN CANAL.

WASHINGTON, D. C., *Tuesday, February 25, 1902.*

The subcommittee met at 10.30 o'clock a. m.

Present: Senators Morgan (chairman) and Hanna; also, Senators Hawley, Kittredge, and Millard, members of the committee.

STATEMENT OF PROF. EMORY R. JOHNSON.

Prof. Emory R. Johnson, a member of the Isthmian Canal Commission, appeared and was duly sworn by the chairman.

The CHAIRMAN. Professor, you have been before this committee heretofore, and you have also made some reports in this matter as a member of the Isthmian Canal Commission, and you answered some interrogatories that I propounded to you, in a letter which has been published. You have seen all these statements, have you?

Professor JOHNSON. I have.

The CHAIRMAN. Have you any change to make in any of the statements or figures that you then gave?

Professor JOHNSON. No, sir. My statements to you have always dealt with the commercial and financial aspects of the question, and I do not think there has been any change in the information which I have given from time to time.

The CHAIRMAN. Before you begin to testify, there is a memorandum to which I should like to call your attention. It consists of three tables, Nos. 1, 2, and 3, which, with the note of explanation by the person who prepared it, I will put in the record, and hand it to you so that you may examine it if you choose to do so.

Senator HANNA. What are the tables about?

The CHAIRMAN. They relate entirely to the quantity of steam and sailing ships in the world, and also in the United States, and the proportionate increase of them for the last ten years.

Senator HANNA. By whom were they prepared, Mr. Chairman?

The CHAIRMAN. By the Bureau of Congressional Information here in Washington, by Mr. Bennett.

Senator HANNA. Who is Mr. Bennett?

The CLERK OF THE COMMITTEE. He was formerly secretary to Hoke Smith, Secretary of the Interior.

Senator HANNA. Is he connected with the Government now?

The CLERK OF THE COMMITTEE. No, sir; he has a bureau of statistical information.

Senator HANNA. Statistics gathered from what source?

The CLERK OF THE COMMITTEE. From Lloyd's publications. They are the source of this information.

Senator HANNA. I think we had better have Mr. Bennett before us.

The CHAIRMAN. All right. This information is an extract from Lloyd's report.

The matter referred to is as follows:

GROWTH OF THE WORLD'S COMMERCE.

Tables are herewith submitted relative to the proportionate growth of steam and sail vessels in the world's commerce during the last ten years. The vessels referred to include only those belonging to the merchant marine of all the various countries, and do not include war ships. In the enumeration no attention is given to vessels of less than 100 tons (gross). The calculations are based in all cases on the gross tonnage.

Table I shows the total tonnage of the vessels, steam and sail (exclusive of war vessels and vessels of less than 100 tons), constructed in all the countries of the world during the years named. The figures are derived and calculated from "Lloyd's Register," of London, the highest authority extant in such matters.

Table II contains a calculation of the percentage of steam and sail vessels constructed in the years named, as derived from Table I. It will be seen that ten years ago, in 1892, the construction of sail vessels was nearly one-third of the total, and that from that time it dwindled to 6 per cent in 1898; but that since 1898 there has been a slight but steady increase of the sail-vessel percentage to 12 per cent in 1901. In round numbers the percentages for 1900 and 1901 are the same—12 per cent—but in reality there was an increase for 1901 over 1900, as the figures, if carried out further, would read: For 1900, 0.116, and for 1901, 0.121.

Table III contains, for purposes of comparison and curiosity, the details of construction, as above, by countries, for the last two years. The authority, again, is Lloyd's.

Table IV is added in order to show the official statement of the number of vessels constructed in the United States during the fiscal years ending June 30, 1900, and June 30, 1901, as reported by the United States Commissioner of Navigation. As this report is for fiscal years and the Lloyd's report for calendar years, no satisfactory comparison between them can be instituted. It is observable, however, that the two sets of figures are not far apart in their conclusions.

TABLE I.

Calendar year.	Steam.	Sail.	Total.
	<i>Gross tons.</i>	<i>Gross tons.</i>	<i>Gross tons.</i>
1892.....	942,063	426,447	1,368,510
1893.....	883,867	204,989	1,088,856
1894.....	1,072,662	150,488	1,223,150
1895.....	1,114,291	103,869	1,218,160
1896.....	1,413,252	154,630	1,567,882
1897.....	1,202,825	129,099	1,331,924
1898.....	1,779,225	114,118	1,893,343
1899.....	1,945,719	176,019	2,121,738
1900.....	2,035,589	268,574	2,304,163
1901.....	2,301,927	315,612	2,617,539
1892-1901.....	14,691,420	2,043,845	16,735,265

TABLE II.

Calendar year.	Steam.	Sail.	Calendar year.	Steam.	Sail.
	<i>Per cent.</i>	<i>Per cent.</i>		<i>Per cent.</i>	<i>Per cent.</i>
1892.....	0.69	0.31	1898.....	0.94	0.06
1893.....	.81	.19	1899.....	.92	.08
1894.....	.88	.12	1900.....	.88	.12 (.116)
1895.....	.91	.09	1901.....	.88	.12 (.121)
1896.....	.90	.10	Ten years (average) ..		.88 .12
1897.....	.90	.10			

TABLE III.

Countries.	1900 (calendar).			1901 (calendar).		
	Steam.	Sail.	Total.	Steam.	Sail.	Total.
	<i>Gr. tons.</i>	<i>Gr. tons.</i>		<i>Gr. tons.</i>	<i>Gr. tons.</i>	
United States ^a	210,782	122,745	333,527	322,143	111,092	433,235
United Kingdom.....	1,432,600	9,871	1,442,471	1,501,078	23,661	1,524,739
British Colonies.....	4,126	5,437	9,563	15,674	12,460	28,134
Austria-Hungary.....	14,889	.....	14,889	20,013	.....	20,013
Belgium.....	3,270	.....	3,270	5,631	.....	5,631
China.....	2,357	.....	2,357	2,463	1,231	3,694
Denmark.....	9,300	1,760	11,060	17,503	5,353	22,856
France.....	19,894	96,964	116,858	52,915	124,628	177,543
Germany.....	195,918	8,813	204,731	201,484	8,109	209,593
Holland.....	35,812	9,262	45,074	27,322	2,605	29,927
Italy.....	62,148	5,374	67,522	56,691	3,835	60,526
Japan ^b	4,543	.....	4,543	28,256	8,952	37,208
Norway.....	32,219	532	32,751	36,517	358	36,875
Russia.....	101	7,139	7,240	554	8,804	9,358
Sweden.....	5,058	677	5,735	5,383	2,858	8,241
Other European countries.....	2,572	.....	2,572	300	1,666	1,966

^a These figures do not include wooden vessels built on the Great Lakes.

^b The figures from Japan are incomplete.

TABLE IV.

Country.	Year ending June 30, 1900.			Year ending June 30, 1901.		
	Steam.	Sail.	Total.	Steam.	Sail.	Total.
	<i>Gr. tons.</i>	<i>Gr. tons.</i>		<i>Gr. tons.</i>	<i>Gr. tons.</i>	
United States.....	202,528	116,460	318,988	273,591	126,165	399,756

Professor JOHNSON. Mr. Chairman, not knowing what line your questioning might take, I jotted down a few points that it seemed to me might possibly be considered here:

The first point I made note of was the sailing vessel in its relation to the canal, and to the choice of routes; and I have before me here the manuscript form of what I suppose will be one volume of the report of the Canal Commission, a report prepared by myself and submitted to the Commission, bearing on the industrial and commercial value of the canal. I do not know what progress has been made in the printing of that report.

Senator HANNA. Very slow.

Professor JOHNSON. I brought down my manuscript copy to refer to in case any detail might arise that I could not answer offhand.

The CHAIRMAN. Is that an appendix to the report of the Isthmian Canal Commission?

Professor JOHNSON. Yes; it is spoken of as Appendix 3. I understand the Public Printer is to include in the first volume the report signed by the Commission with the first two manuscript volumes of

appendixes, and that this, together with some thirteen commercial maps, will constitute the second volume as it will appear. That is what I understand the Public Printer has decided upon.

I judge from the newspapers that there has been a good deal of discussion in regard to the sailing vessel and the canal. I foresaw that that discussion might arise, and one of the longest chapters in my report to the Commission on this general subject of the commercial aspects of the canal, dealt with the use of the isthmian canal by sailing vessels.

The CHAIRMAN. Would you like to insert that chapter in your statement?

Professor JOHNSON. I should think it would hardly be necessary, Mr. Chairman, in view of the fact that it constitutes a part of the report that is to be published. Of course, as I understand, it is the property of Congress.

I may simply say, in regard to that discussion, that I took up first in this chapter of the report a detailed analysis of the present and prospective position of the sailing vessel in the commerce of the world, and I have here quite elaborate data on that point, to which I will briefly refer by saying that during the twenty-five years ending in 1899 the percentage of decrease in the tonnage of sailing vessels was 40 per cent. The decrease in our sailing tonnage happened to be the same, 40 per cent also.

That, however, is only one side of the story. During that twenty-five-year period the steam tonnage of the world increased 336 per cent. Ours increased 68 per cent.

I might read just a paragraph:

“Should our maritime sail tonnage decline only 40 per cent during the coming twenty-five years, it will be reduced to 771,515 gross tons; but there are strong reasons for thinking that the substitution of the engine for the sail will proceed more rapidly in the future than it has in the past. As the sailing vessels wear out they will be replaced by steamers. The American merchant marine engaged in the foreign trade has declined to small proportions, but there is no doubt that economic and political conditions favorable to the restoration of our carrying trade are rapidly developing and that our new marine must almost certainly consist of steamships. The statistics of the tonnage of sailing vessels and steamers constructed in the United States during the five years from 1894 to 1899 tends to confirm this view. During these five years 296,993 gross tons of sailing vessels were built in American yards and 570,831 tons of steamers.”

The CHAIRMAN. What is the last date you mentioned?

Professor JOHNSON. This was the five years ending 1899.

I made a more detailed analysis of the growth of sail and steam tonnage on the Great Lakes. I suppose Senator Hanna is very familiar with the facts there. The sailing tonnage has not quite held its own, if one looks at the surface only of the figures, during the period of twenty-five years ending in 1899. That is, in 1875 the sail tonnage was 339,000 tons. In 1899 it was 318,000 tons. There has been a comparatively small decline in sailing tonnage on the Great Lakes.

As a matter of fact, the decline has been much larger, because the present figures for sail tonnage on the Great Lakes include schooner-rigged barges which are practically always towed by steamers. Just

how much to deduct on that account I am not certain, but a considerable part of the sail tonnage now accorded to the Great Lakes is really not sail tonnage.

The steam tonnage on the Great Lakes during that period—from 1875 to 1899, inclusive—grew from 202,307 tons to 1,014,561. I might read just a little more:

“If it be assumed that the canal across the Isthmus will have been completed and put in operation by 1914, what, according to the foregoing facts, will then be the position of the sailing vessel in our maritime fleet? If the rate of change from sail to steam that has taken place during the ten years from 1889 to 1899 should simply be continued, our seagoing sail tonnage will have declined to about 650,000 gross tons by 1914 and our seagoing steam tonnage will have grown to about 1,500,000 gross tons. But the increase in our seagoing steam tonnage will undoubtedly be more rapid during the coming fifteen years than it has been during the past decade and a half. During the fifteen years from 1884 to 1899 the steam tonnage on the Great Lakes increased 214 per cent.

“If the seagoing steam tonnage of the United States in 1899, 810,800 gross tons, should increase by a like percentage during fifteen years, it would amount to 2,546,000 gross tons in 1914. The assumption of such a growth as this in our seagoing steam tonnage during the first decade and a half of the twentieth century does not seem unwarranted. An estimate would seem to be conservative that placed our sail tonnage at about a sixth of our total tonnage in 1914. Should the sailing vessel after 1914 continue to give way to the steamer, the isthmian canal will be used by sailing vessels only to a limited extent.”

The CHAIRMAN. What authorities do you refer to?

Professor JOHNSON. These are the official statistics, taken from the compilations made by the Commissioner of Navigation. I have also drawn upon London Fairplay for certain statistics, but I have not used those in my report. Everything in my report is based upon official statistics.

The CHAIRMAN. Have you drawn upon Lloyd's statements also?

Professor JOHNSON. Yes; Lloyd's statistics, I think, are considered the best for the general statistics of the world's commerce. I think Lloyd's compilations are the most reliable.

The CHAIRMAN. If they are best for the world at large, they must be the best for every locality, must they not?

Professor JOHNSON. Well, I think Lloyd, for instance, in the case of the United States uses our official statistics.

Senator HANNA. That is exactly what he does.

Professor JOHNSON. I should say if you were dealing with the statistics of American commerce you had better take the statistics published by our Commissioner of Navigation.

The CHAIRMAN. I suppose that Lloyd naturally and necessarily resorts to the official statistics of the United States to ascertain such facts as we are referring to now. Well, professor, have you anything further to say?

Professor JOHNSON. The next division of this discussion was the consideration of the question whether there would in the future be special classes of traffic that would adhere to the sailing vessel, such as coal, lumber, grain, nitrate of soda, and sugar.

I went into an analysis of that fact and came to the conclusion that

even with those special classes of traffic the facts show that steamers were quite rapidly taking the place of the sailing vessel.

The latter part of the discussion deals with the time of passage between north Atlantic and north Pacific ports by way of the Cape of Good Hope, and the probable time by way of the Nicaragua and Panama routes for sailing vessels.

The CHAIRMAN. You had better state that.

Professor JOHNSON. A sailing vessel now takes about one hundred and forty days, on an average, from New York to San Francisco. It gets back in one hundred and ten to one hundred and fifteen days. The most careful study that has been made of the probable time that it would take sailing vessels to go between New York and San Francisco by the isthmian route was made by Lieut. Frederick Collins, U. S. N., in 1872. He studied the winds and currents prevailing at different seasons of the year in each part of that section of the ocean that would be traversed by sailing vessels plying between Panama, Nicaragua, and other Pacific ports, and then estimated the number of days that it would, on an average, take a sailing vessel to make the voyage between the two isthmian ports and other Pacific harbors. Calculations based on his studies lead to the following conclusions:

For the Cape route, outbound from New York to San Francisco, one hundred and forty days; for the Panama route an average time of fifty-nine days, and for the Nicaragua route fifty days.

On the return voyage, assuming that one hundred and fifty days is the average time required for a vessel to make the eastbound trip around the Horn, I find that fifty-five days would be the average time for a vessel to get back by way of the Panama route and fifty-one days the average for the Nicaragua route.

The figures for voyages between our seaboard were obtained from Grace & Co. and Flint & Co., who gave me the logs of their vessels for a full year.

Senator HANNA. That is between New York and Chile?

Professor JOHNSON. Between New York and San Francisco. I take those as typical ports.

Senator HANNA. Do they run a line between those ports?

Professor JOHNSON. Grace & Co. run to Chile. Flint & Co. run between our two seaboard.

The CHAIRMAN. What kind of vessels?

Professor JOHNSON. They ran sailing vessels for many years. Three years ago Flint & Co. sold out their line of sailing vessels and have now put on a line of steamers on that route.

I do not know that I need to go any further into that point. In the report I have put the saving in time by each of the two routes, Nicaragua and Panama, over the present route into a saving of dollars.

Senator HANNA. I should like to hear those figures.

The CHAIRMAN. Have you any statement to make in regard to the prices of coal on the Pacific coast?

Professor JOHNSON. I have an elaborate chapter that goes into the question of coal in all its different phases, which chapter some members of the Commission consider the most valuable contribution that the report makes. I will take up some points in that, if you desire to have me do so.

The CHAIRMAN. Oh, yes; we want to get the whole situation.

Professor JOHNSON. I went at this question of changing time into

money by getting from reliable shipowners statements of the cost of running vessels—that is, I do not mean merely the cost of movement, but the cost from the standpoint of chartering—how much does the man who charters a vessel lose by the vessel's losing a day and how much does he gain by saving a day.

The CHAIRMAN. That would depend upon whether he wanted to get into port or not.

Professor JOHNSON. No; if a man charters a vessel for a year his daily cost would be, of course, the proper proportion of the year's cost. Charters are by the month, by the year, or by the trip.

Peter Wright & Son—Frank Neall, really—of Philadelphia, took this matter up with the maritime exchange of that city, and their report was that \$75 per day will cover all the expenses of operating a sailing vessel of 2,000 tons. I took that basis. A sailing vessel in order to get through the canal has to pay towage, so it was necessary for me to ascertain from towage companies what the probable cost of towage would be. And then I had to assume some toll to be paid for the use of the canal.

Senator HANNA. What basis did you take for that?

Professor JOHNSON. I took \$1 a ton, net register.

Senator HANNA. What is the toll on the Suez Canal?

Professor JOHNSON. It is a little over \$2 per ton, as we measure a vessel. It is 9 francs per ton, as they measure a vessel, but their measurement comes out considerably larger than our measurement. I have taken up this point in the concluding chapter on the question of toll. I have gone into that matter with a good deal of detail. For a sailing vessel of 2,000 tons a saving of eighty-one days from the present time, at \$75 a day—the gross saving—equals \$6,075. Taking the toll of \$1 per ton, or \$2,000, and adding it to a towage charge of \$450, making a total of \$2,450, and deducting that from the \$6,075, leaves a net saving of \$3,625.

For the Nicaragua Canal the account would stand as follows:

Ninety days at \$75 per day, \$6,750; toll, \$2,000; towage, \$600, which added together makes \$2,600. Deducting that from \$6,750 the net saving would be \$4,150, a considerably larger saving in the case of the Nicaragua route, in spite of the somewhat larger towage cost.

The CHAIRMAN. In your examination of this question did you look into the subject of towage on the Great Lakes?

Professor JOHNSON. No; I got at this towage question by writing to twenty of the large towing companies and stating the problem to them and asking them to give me an estimate of what the towage charges would probably be.

The CHAIRMAN. Did you do that in respect to the Great Lakes of the North?

Professor JOHNSON. No; I did not. I took it with reference to towage on the Atlantic seaboard.

The CHAIRMAN. You do not know the prices of towage on the Great Lakes?

Professor JOHNSON. I do not. I have never investigated that.

The CHAIRMAN. Or what competition there is there amongst tugs?

Professor JOHNSON. On the Atlantic?

The CHAIRMAN. No; on the Great Lakes.

Professor JOHNSON. I can not answer with regard to the towage on the Great Lakes. I have never investigated that.

Senator HAWLEY. There is a gentleman here (Senator Hanna) who probably can tell you a good deal about it.

Senator HANNA. I can tell you all about it, if you want to put me on the witness stand.

Professor JOHNSON. I am very sure the towage charges are very much less on the Great Lakes than on the ocean, from what I have always been told.

The CHAIRMAN. Owing to the competition?

Professor JOHNSON. No, I think it is the long distance and the very large cargoes that make the difference. If you are going to tow 6,000 tons 900 or 1,000 miles, your towage cost would be very low, as compared with towing the same cargo even 100 or 200 miles.

If there are no other questions on this matter of the sailing vessel I will simply state some of the conclusions I came to as the result of this study.

"Among the general deductions that seem warranted by the facts set forth in the preceding pages are the following:

"1. A canal across Nicaragua would enable a sailing vessel to accomplish a greater net saving over the expenses of the present route around the Horn than could be effected by using a Panama canal. The difference in the advantages of the two routes for sailing vessels, while not large, is sufficient to be made a factor of some importance in deciding which route should be adopted, were it possible that either route should be largely used by sailing ships.

"2. Neither the Nicaragua Canal nor the one across the Isthmus of Panama would be much used by sailing vessels. The unmistakable tendency of commerce is to use steamers instead of sailing vessels for all classes of traffic. The sailing vessel would compete with the steamer for the traffic through either of the canals under conditions so unfavorable as to make practically certain the general substitution of the steamer for the sailing vessel for all lines of trade through the Isthmian waterway.

"The consideration of the Nicaragua and the Panama canal routes, from the standpoint of their relative usefulness as commercial highways, becomes mainly a question of determining which is the more advantageous route for the steamers engaged in the maritime commerce of the United States in particular and of the world in general."

The CHAIRMAN. Do you go upon the assumption that steam navigation is cheaper per ton per mile across the ocean than sailing navigation?

Professor JOHNSON. No; I draw conclusions in regard to the future of the sailing vessel from two sources of information—one is the statistical showing, which indicates the very rapid substitution of the steamer for the sailing vessel; and second, an extensive correspondence and a good deal of conference with the men who are doing business with sailing vessels and with steamers.

The CHAIRMAN. My question, Professor, is based upon the proposition or the assumption, which I think is a very correct one, that transportation on the ocean will always seek the shortest and cheapest route.

Professor JOHNSON. Yes.

The CHAIRMAN. And the cheapest method of propulsion, the cheapest power: and I understand you that you do not think that in ocean

travel steam power, in going around the Horn for instance, is cheaper than wind.

Professor JOHNSON. I have no doubt that you can move a vessel 1,000 miles by sail cheaper than you can move it by steam.

The CHAIRMAN. If you can do that, you can move it 2,000 miles cheaper by sail than by steam.

Professor JOHNSON. But business men are finding it more economical for them to use the steamer instead of the sailing vessel.

The CHAIRMAN. Some of them may, on account of the nature of their business, but I am taking the question of the transportation of the commerce of the world upon an interchange of commodities.

Professor JOHNSON. I take it the business of the world is seeking the most economical means of carrying, and the sailing vessel is giving way to the steamer, because it is the more economical agent.

The CHAIRMAN. And yet it is your opinion that wind power for propelling ships is cheaper than steam power?

Professor JOHNSON. I was very guarded in my statement, Senator. My statement was that you could move a vessel 1,000 miles cheaper by wind than you could by steam.

The CHAIRMAN. Well, taking 10,000 miles, and then taking 20,000 miles, can you not move it cheaper that distance by wind than you can by steam?

Professor JOHNSON. Yes; but you are well aware of the fact that only one of the expenses of running a vessel is to move the vessel through the water, and a vessel as I understand it is merely a business tool; and business men are finding that the steamer is the more economical tool to use.

The CHAIRMAN. Well, the longer the voyage by wind, as compared with the voyage of the same vessel by steam, would you not say that the wind voyage was cheaper than the steam voyage for 10,000 miles or 20,000 miles?

Professor JOHNSON. I would say this, that if the sailing vessel could hold its place anywhere in the world's commerce it would be on the longest distance route, and for that very reason I went very carefully into the question——

The CHAIRMAN. It would be very convenient to me if you would answer my question. Will the stenographer please read my question?

The stenographer read the question, as follows:

“Well, the longer the voyage by wind, as compared with the voyage of the same vessel by steam, would you not say that the wind voyage was cheaper than the steam voyage for 10,000 miles or 20,000 miles?”

Professor JOHNSON. I would say no to that.

The CHAIRMAN. Will you please explain why you would say no?

Professor JOHNSON. There are three lines of vessels running between New York and Australia. Until a few years ago they were entirely sailing vessels, but now in the case of all three lines there has been a large substitution of steam for sail, and the substitution is going on at the present time. It will be only a few years when on that route—which is one of the longest routes in the world—the steamer will have entirely displaced the sailing vessel.

Secondly, until a few years ago, Flint & Co. operated a line of sailing vessels between New York and San Francisco, which is another one of the long routes of the world. They sold out their entire fleet,

and have now in operation 7, and soon will have 9, modern slow freight steamers.

Senator HAWLEY. What was the word you used in describing those freight steamers?

Professor JOHNSON. Modern slow freight steamers, 9-knot steamers.

Senator HAWLEY. Is that considered the economical rate—9 knots?

Professor JOHNSON. Yes; so I am told, that about 9 knots on a long distance is more economical than any other speed, more so than even 10 or 12.

The CHAIRMAN. The companies you mention as having abandoned sailing vessels for steamers, do they send their vessels around the Horn?

Professor JOHNSON. They go through the Straits of Magellan.

The CHAIRMAN. That cuts off a considerable distance?

Professor JOHNSON. Yes; but they navigate between New York and San Francisco.

The CHAIRMAN. I understand, but going through the straits cuts off a considerable distance.

Professor JOHNSON. It cuts off about 2,000 miles.

The CHAIRMAN. Now, a sailing ship can not go through the straits.

Professor JOHNSON. No.

The CHAIRMAN. Then, that accounts for it.

Senator HAWLEY. Do you mean that a sailing vessel can not go through the Straits of Magellan?

Professor JOHNSON. It can not, as a practical proposition.

Senator HANNA. In your judgment is the change from sailing vessels to steam vessels accounted for by the fact that the sailing vessels can not go through the Straits of Magellan?

Professor JOHNSON. That is not my information. It takes the steamer, running on this slow schedule, sixty days to make the trip from New York to San Francisco. It takes sailing vessels one hundred and forty days, and there you have the cause of the substitution of the steamer for the sailing vessel.

The CHAIRMAN. In the saving of time?

Professor JOHNSON. It is in the saving of time, and in the fact that a vessel which can do the work in sixty days instead of one hundred and forty days is the more efficient business tool.

The CHAIRMAN. If the cargo you are carrying does not require the saving of time then that factor is lost, is it not?

Professor JOHNSON. But the cargo which passes over that route does require a short time, and in the competition between the water route and the rail route the 60-day vessel has a great advantage over the 140-day vessel.

The CHAIRMAN. It is that saving of time; it is the value of that competition, that you have taken into account, is it not?

Professor JOHNSON. That is it in part; yes.

The CHAIRMAN. It is a large part of your calculation, is it not?

Professor JOHNSON. There are a great many factors which enter into the question. Insurance is one, and a large item.

The CHAIRMAN. But is not this the fact—please note the question instead of making an argument. The questions are easy enough. I asked you if this competition was not a large part of the calculation you made.

Professor JOHNSON. I was answering that it was one of the factors that influenced me.

The CHAIRMAN. Do you think it is not a large one, not an important one?

Professor JOHNSON. No; I should say not.

Senator MILLARD. You consider that time is a factor in the carrying of a cargo nowadays?

Professor JOHNSON. Yes; it is.

Senator MILLARD. Even coal, or iron, or anything of that kind?

Professor JOHNSON. I understand it is. About the only cargo where time is not important is grain between San Francisco and Liverpool, where the storage en route is advantageous. They do not object to the long time of the voyage; but I know on no other line of traffic where that is true.

The CHAIRMAN. I want to ask you there how are these steamers supplied with coal on their voyage from New York to San Francisco? At what points?

Professor JOHNSON. They take on coal in New York and again at Coronel; that is, the Flint steamers do. After the canal is opened they would probably take on coal at New York, and that would take them clear through.

The CHAIRMAN. At the present time what are the coaling stations for a steamer from New York to San Francisco?

Professor JOHNSON. New York and Coronel, and again on the Pacific coast.

The CHAIRMAN. Where? I want the points.

Professor JOHNSON. New York, Coronel, and San Francisco, and then at Coronel on the return voyage.

Senator HAWLEY. Where is Coronel?

Professor JOHNSON. Coronel is one of the ports in central Chile, near the Chilean coal fields.

The CHAIRMAN. They do not coal at the Falkland Islands?

Professor JOHNSON. No.

The CHAIRMAN. Or at Buenos Ayres?

Professor JOHNSON. No; they coal only at Coronel en route, so they tell me.

The CHAIRMAN. What tonnage of coal would be required to carry a ship of 2,000 tons from New York around on the whole voyage?

Professor JOHNSON. I have some figures on that. I think I can give them from memory. A thousand tons of coal will take one of their steamers 5,000 miles.

The CHAIRMAN. How many miles is it around?

Professor JOHNSON. It is about 13,000 miles around, I believe. I have not figured out that part of the problem exactly.

Senator HANNA. It will take about 2,500 tons to go around?

Professor JOHNSON. Yes.

The CHAIRMAN. As a matter of fact, from what points is this coal obtained?

Professor JOHNSON. There is a coal field in Chile, you know, in that region a little back of Coronel.

The CHAIRMAN. Is it mined?

Professor JOHNSON. Yes.

The CHAIRMAN. What kind of coal is it?

Professor JOHNSON. It is a fair grade of bituminous coal.

The CHAIRMAN. Do these ships use that coal or do they get coal from Wales?

Professor JOHNSON. They use the Chilean coal.

The CHAIRMAN. Exclusively?

Professor JOHNSON. That is the coal they take on at Coronel—that coal is Chilean coal.

The CHAIRMAN. They start with American coal and go to Coronel?

Professor JOHNSON. Yes; and you see they use American coal more than they do Chilean coal.

The CHAIRMAN. Are the various coaling stations you speak of supplied by mines in the vicinity?

Professor JOHNSON. Yes; the Coronel mines are close to the port of Coronel, I can not say just how far, but there is a small coal field there that is quite close to the ocean.

The CHAIRMAN. And you say that these coaling stations are supplied from the mines in the vicinity?

Professor JOHNSON. At Coronel, yes.

The CHAIRMAN. There are other coaling stations, are there not, on those coasts?

Professor JOHNSON. Oh, yes; there are numerous coaling stations. I was speaking of the Flint Line of steamers.

The CHAIRMAN. How are those coaling stations supplied with coal around the whole coast of South America, east and west?

Professor JOHNSON. On the east coast of South America the coal is nearly all British. On the west coast, British and Australian coal, and on the west coast of Central and North America, American coal, Australian coal, British coal, and Japanese coal.

The CHAIRMAN. From what part of America does the American coal come?

Professor JOHNSON. From Puget Sound.

The CHAIRMAN. Now as to the transportation of these coals to these different coaling stations, what power is used, sail or steam?

Professor JOHNSON. Both sail and steam are used.

The CHAIRMAN. Which is used the most?

Professor JOHNSON. Sail is used the most. The coal is brought over in ballast, and at the present time the grain and the nitrate are carried mainly by the sailing vessels.

The CHAIRMAN. What are the average prices of steaming coals on the Pacific, at the points you have mentioned, points on the west side of South America?

Professor JOHNSON. I can not answer that question.

The CHAIRMAN. Or on the east side.

Professor JOHNSON. I have not taken up that matter.

The CHAIRMAN. All vessels of war that visit those waters have to coal at those coaling stations, do they not?

Professor JOHNSON. I have no doubt they do coal on both sides.

The CHAIRMAN. Have you examined to see whether they pay extraordinary prices or whether they pay normal prices?

Professor JOHNSON. No, sir; I have not.

The CHAIRMAN. Go ahead.

Senator HANNA. In determining the fact as to the economies of operation between sail and steam, the men who invest their money in water transportation for a profit or an expected profit are the ones

who study the economies, and the results as demonstrated form the evidence that guides you in your estimates?

Professor JOHNSON. Yes.

Senator HANNA. The people who are in this business of water transportation, except in the primitive methods of transportation, have learned that economy lies in the substitution of large, slow speed, freight-carrying steamers?

Professor JOHNSON. That is true.

The CHAIRMAN. How is it with those people who do not go into business for profit, but who go into it for chartering ships, or building ships to conduct their own business and transportation on their own account?

Professor JOHNSON. The steamer is taking the place of the sailing vessel. I have letters received from 15 large firms operating vessels between European ports and Australia, and in every case the testimony is that the steamer is being substituted in place of the sailing vessel.

I have already spoken of our trade with Australia. I could add a large amount of evidence on that point if you desire it.

Senator HANNA. I should like to have that evidence, Professor.

Professor JOHNSON. I will refer first to a statement made to me two days ago, not in this report, by the largest lumber concern in our city of Philadelphia. They are lumbering some 30 or 40 miles back from Charleston.

Until very recently they had chartered about 20 schooners to bring their lumber up. They have now in commission a large freight steamer drawing 23 feet of water that does the work of these 20 schooners. They are saving \$4,000 a year on insurance, and they are able to say to their customers when the lumber will be delivered to them, and they are finding the present service much more satisfactory than the former service was.

The CHAIRMAN. Is that a large company?

Professor JOHNSON. Yes.

The CHAIRMAN. A strong company?

Professor JOHNSON. They have a large business. They handle many million feet every year.

The CHAIRMAN. And there is great competition in Philadelphia in the lumber trade, is there not?

Professor JOHNSON. Yes; there is a large competition. There are a large number of firms.

Senator HANNA. That is the reason they have studied these economies?

Professor JOHNSON. Yes; they must get the most economical carrier.

A few years ago when Mr. Flint, who is at the head of the big lumber combination operating from Georgetown, took up the question of how to transport their lumber from Georgetown to the north, they decided to build two 5,000-ton steamers instead of using sailing vessels.

I speak of this lumber business because if there is anything that will hold the sailing vessel it ought to be the lumber trade, because it moves in cargo bulk and it is not the kind of a commodity that requires very rapid movement.

The CHAIRMAN. What is the length of the voyage in the case you have just mentioned?

Professor JOHNSON. From Charleston to Philadelphia, I should say

450 miles, possibly. I have not the exact figures. It is a comparatively short voyage. But take the nitrate trade from the west coast of Chile. It goes to Germany and Great Britain and to all the beet-sugar countries on the Continent besides Germany.

Until recently that business was all handled by sailing vessels, but now the steamers have a large part of the business.

The CHAIRMAN. How is it about the wheat on the Pacific coast?

Professor JOHNSON. The wheat on the Pacific coast has adhered to the sailing vessel almost entirely.

The CHAIRMAN. Why?

Professor JOHNSON. And it probably will continue longer than any other line of trade, because on the Pacific coast they do not have the elevator system. As soon as the rainy season threatens them they get the grain into the vessels, which are the storehouses for some three or four months, while the grain is on the way to the consumer in Europe.

The CHAIRMAN. There is no trade on the Pacific coast that is equal to the wheat trade, is there, in value?

Professor JOHNSON. No, not at the present time, although the wheat trade is a declining one and the lumber trade is a growing one.

The CHAIRMAN. How about the lumber. Does that go in steamers from the Pacific coast?

Professor JOHNSON. That goes mostly on sailing vessels, although steamers are beginning to cut into that trade, even.

The CHAIRMAN. How long do you think the lumber trade will stick to the sailing ship?

Professor JOHNSON. Oh, I should say that the substitution there would go on gradually. Probably that substitution will take twenty years. That is, the sailing vessels will be worn out. They are not going to be laid aside; but the new vessels built for any important line of trade are almost certain to be steamers; not absolutely certain, but almost.

The CHAIRMAN. Just there it is convenient to ask you, What is the actual gross tonnage of steamships and sailing ships under American register?

Senator HANNA. Have you got the latest report?

Professor JOHNSON. I have not the latest report of the Commissioner of Navigation.

In 1900 we had 1,183,000 tons of steamers and 1,360,000 tons of sailing vessels. These figures are from London Fairplay. These tables are given annually in the reports of the Commissioner of Navigation.

Senator HANNA. Have you got them back for several years?

Professor JOHNSON. I have, for the world.

Senator HANNA. Not for the world, but for the United States.

Professor JOHNSON. Not for the United States; but these tables are always given for periods of years, that show the trade. I can give them to you separately for a period of years from my report here if you desire them.

The CHAIRMAN. I suppose that the statistical accounts by the Bureau of Navigation are based upon the same information upon which you base your calculations.

Professor JOHNSON. The reports of the Commissioner of Navigation

are based upon the records of the Treasury Department, and my facts are taken from the published tables of the Bureau.

Senator HANNA. They are obliged to have a record of all the tonnage?

Professor JOHNSON. Yes; under our registry laws every vessel is registered.

The CHAIRMAN. So that we approximate accuracy in these statements.

Professor JOHNSON. Approximate, although not absolute, because vessels very often remain on the register after they go out of service.

The CHAIRMAN. What percentage of sailing vessels is engaged in the coastwise trade?

Professor JOHNSON. About three-fifths, if I remember rightly, of our seagoing marine is made up of sail and two-fifths of steam.

The CHAIRMAN. In the coastwise trade?

Professor JOHNSON. I can not give you the figures from the coastwise trade separately from the others.

Senator HANNA. In stating that tonnage you mean tons measurement?

Professor JOHNSON. Net register.

The CHAIRMAN. All the tonnage you speak of is on the same footing, is it not?

Professor JOHNSON. Yes; our figures are on the basis of net register.

Senator HANNA. As to the carrying capacity of that tonnage, as between sail and steam, to show how many tons of freight could be carried? Have you any figures to show the difference?

Professor JOHNSON. The ordinary ratio there is that 1 ton of steam is worth 4 of sail. That is the ratio in the tables of the Bureau Veritas.

The CHAIRMAN. That 1 ton of steam is worth 4 tons of sail?

Professor JOHNSON. That 1 ton of steam is equal in efficiency to 4 tons of sail.

The CHAIRMAN. That is on account of the rapidity of the voyage?

Professor JOHNSON. Yes.

The CHAIRMAN. And only on that account.

Professor JOHNSON. Well, on that account, and on account of the fact that the ratio of cargo to registry is higher in the case of the steamer than in the case of the sailing vessel. A freight steamer carries from $2\frac{1}{4}$ to $2\frac{1}{2}$ tons of cargo per ton of net register. A sailing vessel carries from $1\frac{1}{2}$ to $1\frac{3}{4}$ tons of cargo per ton of net register.

The CHAIRMAN. What is the cause of that difference?

Professor JOHNSON. The sailing vessel has to be built on sharper lines, whereas the hull of the steamer is blunt, almost fills a right angle cross section of the hull. The cross section of the sailing vessel fills only a much smaller part of the rectangle.

The CHAIRMAN. That is to say, the interior dimensions of the steamer are greater per cubic yard than the sailing vessel.

Professor JOHNSON. Per net register.

The CHAIRMAN. Owing to the configuration of the ship for sailing purposes?

Professor JOHNSON. Yes.

Senator HANNA. With reference to this canal transportation by sail or steam, you estimate the cost of towing at \$450 by one route and \$600 by another. Would that be a fair difference in towing a vessel 50 and 185 miles?

Professor JOHNSON. No; and in order to make that statement more intelligible I ought to give you what that signifies.

I gave the estimate of towage cost for the Panama route as \$450 and for the Nicaragua route as \$600, and, as I said, in order to secure reliable estimates of probable cost I wrote to 20 different companies, requesting information, and stating in the letter of inquiry that the total length of the canal at Nicaragua would be about 190 miles; that of this distance about 70 miles would consist of excavated channel, about 50 miles of improved river navigation, and about 70 miles of lake; that the distance from anchorage at Colon to anchorage at Panama is about 47 miles, a short distance being open navigation. I also stated that it was probable that sailing vessels would usually desire to be towed about 100 miles from Panama out to sea——

Senator HANNA. That is what I wanted to get at.

Professor JOHNSON. So that in the case of Panama my estimate included that.

Senator HANNA. You have taken into account the towing of the vessel 100 miles out to sea after leaving Panama?

Professor JOHNSON. Yes.

Senator HANNA. That is what I wanted to bring out.

The CHAIRMAN. Then when you get 100 miles out to sea from Panama the towage account would be balanced?

Professor JOHNSON. No; the towage account, including the trip through the canal and 100 miles out to sea, was \$450 for Panama and the towage through Nicaragua was \$600.

Senator HANNA. I want to ask you this question——

The CHAIRMAN. Just a moment. I do not understand you. I understand that if you tow a ship a certain number of miles through Nicaragua, and if you tow a ship the same number of miles through Panama, the price would be the same, would it not?

Professor JOHNSON. No; because the towage would be cheaper in the Bay of Panama than it would be through the restricted channels of the Nicaragua route.

The CHAIRMAN. Why would it be cheaper?

Professor JOHNSON. Because it is cheaper to tow a vessel out in the open sea—that is, in a large bay—than it is to tow through a canal.

The CHAIRMAN. Why is that?

Professor JOHNSON. The vessel can be towed more rapidly, there is less friction, and then the towboat in going back can return more quickly.

The CHAIRMAN. It is cheaper to tow a vessel out at sea, taking the risk of winds and storms, than it is to tow the ship through a canal?

Professor JOHNSON. It is cheaper to tow a vessel on the Bay of Panama than it would be to tow her an equal number of miles in the Nicaragua Canal.

The CHAIRMAN. Do you make an exception of the Bay of Panama?

Professor JOHNSON. The Bay of Panama is an exceptionally favorable place for towage; yes.

The CHAIRMAN. Why is it exceptional?

Professor JOHNSON. Because the water is never rough there.

The CHAIRMAN. No wind?

Professor JOHNSON. No wind.

Senator HANNA. That is, the winds are off shore, are they not?

Professor JOHNSON. The winds are offshore, what there are, and they are light.

The CHAIRMAN. Do you know anything about the winds there?

Professor JOHNSON. I have made a careful study of Lieutenant Collins's investigations of that question. I have been there myself, although what one sees personally does not amount to much.

The CHAIRMAN. We have the hydrographic charts here that show exactly.

Professor JOHNSON. Yes; I have consulted those. It is possible for a vessel to get in and out of the Bay of Panama, and sailing vessels now do. Lieutenant Collins estimated that on an average it would take a vessel ten days to get from the city of Panama to where it could get favorable winds.

The CHAIRMAN. How long ago was that report made?

Professor JOHNSON. That was in 1872.

The CHAIRMAN. That is the report you stand on?

Professor JOHNSON. I know of nothing so detailed, and it seemed to me to be thoroughly reliable.

Senator HANNA. The facts embodied in that report have not materially changed?

Professor JOHNSON. No; they could not have changed.

Senator HANNA. Now, Professor, speaking about the long voyages around the Cape with grain for storage, do you believe that even after the canal was constructed, if the grain of California was still carried to Liverpool and the markets of Europe by these same vessels, that they would always choose to go through the canal in preference to going around the Horn?

Professor JOHNSON. I think after the canal is opened, sir, that the grain trade of California will be handled in mammoth freight steamers of 10,000 to 12,000 tons, and that the sailing vessel will disappear very rapidly from service.

Senator HANNA. I do not think there is any doubt about that.

Senator KITTREDGE. What is your conclusion regarding the coal supply?

Professor JOHNSON. First. "That the coal consumed for commercial and industrial uses on the west coast of the American continents, in Hawaii, and in the coaling stations of the eastern half of the Pacific Ocean will be supplied in the future mainly from the mines of the United States and Canada, unless the opening of the Chinese mines should revolutionize the coal trade of the Pacific. It is not probable that coal from the Orient or Australia will in the future be sold on this side of the Pacific. In this case, however, China is, as usual, the uncertain factor."

Second. "The isthmian canal will enlarge the export markets for Americans both by creating a demand for coal in Gulf, West Indian, and Central American stations, to supply the steamers that will be engaged in our own and Europe's commerce through the canal, and also by opening in the Pacific ports of the American continents a coal market that is now important and which is certain to grow. We shall secure the largest share and probably nearly all of a coal trade that is now possessed by Great Britain and Australia, and the industrial progress that will result from the use of the canal will add to the volume of that trade."

In this chapter, which is quite lengthy, I went into the question of the coal supplied by the mines in the eastern part of the United States, and in the Southern States, down in Senator Morgan's State of Alabama, and in the Puget Sound region, and then took up the question

of the cost of transportation to the Pacific markets, and then made a study of the present prices of coal in the Pacific markets of the United States, and came to the conclusion that coal from New Orleans, Mobile, Norfolk, and Newport News would find a considerable market west of the canal.

Senator HANNA. Where do you get the coal from that is shipped from New Orleans?

Professor JOHNSON. Shipped down the Ohio River.

Senator HANNA. Pennsylvania coal?

Professor JOHNSON. Coal could be shipped down the Ohio river and sold at New Orleans for \$2.25 per ton profitably, if the market did not bring any more than that.

The CHAIRMAN. They are selling it now at Mobile at \$1.50 a ton.

Professor JOHNSON. Coal can be put down at Mobile for \$1.50. I was going to make one more statement. The movement of our traffic from the Pacific to the Atlantic will be much more bulky than from the Atlantic to the Pacific. The result will be a large movement of vessels in ballast, or with part cargoes from the coal regions this side of the canal to regions beyond, and so the conditions that make it possible for Great Britain to export such great quantities of coal will to a considerable extent exist here in America after the canal is opened, and so we shall have coal going through at a very low rate.

Senator HANNA. As regular ballast?

Professor JOHNSON. Yes.

The CHAIRMAN. France has no coal, has she?

Professor JOHNSON. She has an insufficient quantity. She imports a good deal.

The CHAIRMAN. She imports coal all the time?

Professor JOHNSON. Yes.

The CHAIRMAN. I took from Lloyd's the statement that in the year 1900 France constructed a steam tonnage of 19,894 and a sail tonnage of 96,964 tons, or a total tonnage of 116,858 tons.

In 1901 France constructed vessels of steam tonnage, 52,915 gross tons, and in the same year she constructed 124,628 tons of sailing ships; total, 177,543, as compared with 116,858 tons in 1900. Would you say that indicated a growth of steam or sailing ships?

Professor JOHNSON. Well, the facts speak for themselves on that, do they not?

The CHAIRMAN. They do.

Professor JOHNSON. If you want my explanation for it I will give it to you.

The CHAIRMAN. Certainly I do.

Professor JOHNSON. France is stimulating the building and operation of sailing vessels by a very liberal bounty.

The CHAIRMAN. Why has she done that in preference to steam?

Professor JOHNSON. Because of the influence of vested interests. I think.

The CHAIRMAN. That is your supposition?

Professor JOHNSON. That is my supposition.

The CHAIRMAN. You do not know of any actual facts that prove that, do you?

Professor JOHNSON. No; I do not know of any facts. I think she has made a mistake.

Senator HANNA. The fact of an insufficient supply of coal and the high price of coal would be a factor.

Professor JOHNSON. That is a factor. France has to compete with Great Britain as a carrier, and is put to it very severely to meet that competition.

The CHAIRMAN. Now, as to the increase in the tonnage of sailing ships in the United States between the years 1900 and 1901, quoting from the same authority, in 1900 there were built 210,782 tons of steam vessels and 122,745 tons of sailing ships.

In 1901 we built 322,143 tons of steam vessels, and we built of sailing ships 111,092 tons, making a total of 433,235 tons.

Now, for 1901, was that not a very great increase upon 1895 in the construction of sailing ships?

Professor JOHNSON. I should have to look up the figures, Senator.

The CHAIRMAN. I should be very glad if you would do so.

Professor JOHNSON. I do not know that I have them here.

Senator HANNA. Do not the tables show the increase?

The CHAIRMAN. Yes.

Professor JOHNSON. The tables show a very large increase of steam, and show no increase for the years you quoted—1900 and 1901—for sail.

The CHAIRMAN. No; but I speak of a different period now. I am speaking of the comparison between 1895 and 1901.

Professor JOHNSON. I have not before me the figures for construction tonnage.

Senator HANNA. The increase of sail tonnage under American register for the last two or three years has been largely on the Great Lakes, has it not, in those barges that carry canvas and which are towed by steamers, going in pairs always? That is the principal increase in sail tonnage in the last few years.

Professor JOHNSON. Two of the important reasons accounting for our sail tonnage at the present time are, first, these schooner-rigged barges on the Great Lakes—

Senator HANNA. Both on the lakes and on the Atlantic coast?

Professor JOHNSON. Yes; and then, second, the construction of several five and six masted schooners for special lines of traffic, like petroleum and coal.

The CHAIRMAN. Table No. 2, which I will hand you, is a calculation of the percentage of steam and also of sail vessels constructed in the years named, derived from Table No. 1, from which I have read to you a few extracts pertaining to the United States. The table also covers the whole world. The note to this table says:

“It will be seen that ten years ago, in 1892, the construction of sail vessels was nearly one-third of the total, and that from that time it dwindled to 6 per cent in 1898; but that since 1898 there has been a slight but steady increase of the sail vessel percentage, to 12 per cent in 1901. In round numbers the percentages for 1900 and 1901 are the same, 12 per cent; but in reality there was an increase for 1901 over 1900, as the figures, as carried out further, would read for 1900, 11.6, and for 1901, 12.1.”

Now if those figures are correct on those tables, and they are extracted from the Lloyd's report, I have stated to you what the result is as to the percentage of increase, and it shows that since 1896 there has been a slow but steady increase in the construction of sail ships in the United States. So that instead of going out, they are coming in.

Professor JOHNSON. This table alludes to the United States, does it?

The CHAIRMAN. It does.

Professor JOHNSON. Alone?

The CHAIRMAN. Yes; what I have read.

Professor JOHNSON. The showing is much worse for the sailing vessel than I supposed it was, Senator. We have 88 per cent of our tonnage built of steam, and 12 per cent sail. Nine years earlier it was only 69 per cent for steam and 31 per cent sail.

The CHAIRMAN. But, still, since 1895 there has been a steady increase in the growth of sailing ships.

Professor JOHNSON. You are aware that during the year 1899 there was a considerable increase in the activity in the yards of the sailing vessel builders, because of the very high price of coal, and because of the demand for ships on the part of the nations engaged in war.

The CHAIRMAN. Now that is true, and no doubt you have given the right reason for it, and that brings me to a point I want to ask you about.

When you convert all of the transportation of the world into steamships, do you not naturally expect that the price of coal will, at times at least, or uniformly, be high.

Professor JOHNSON. The price of coal is not going to decline in the future very greatly, nor do I see any reason for expecting it to advance very largely.

The CHAIRMAN. The quantity of coal will decline in the future, will it not?

Professor JOHNSON. Oh, as I understand, some of the largest supplies of the world's coal have not been touched yet.

The CHAIRMAN. No; but every bushel of coal you take out of the earth is that much lost. It is not replaced by any other fuel or in any other way.

Professor JOHNSON. That is true.

The CHAIRMAN. Now, if the world, for a thousand years to come, is to draw upon its coal mines for its power to propel ships, will not that necessarily make the price of coal go up?

Professor JOHNSON. What the price of coal will be a thousand years from now or what the world's motive power will be a thousand years from now I would not undertake to say.

The CHAIRMAN. Well, a hundred years from now.

Professor JOHNSON. Or a hundred years from now, what the power will be I would not undertake to say.

The CHAIRMAN. Or fifty years from now.

Professor JOHNSON. Fifty years from now I should say the price of coal, judging on the theory of probabilities, would not be essentially higher than it is at the present time.

The CHAIRMAN. How was it that the price of coal went up, as you stated just now? What made it go up?

Professor JOHNSON. There was an enormous and sudden expansion in the consumption of coal.

The CHAIRMAN. If the consumption of coal suddenly and enormously expands by a transfer of the motive power of ships from sail to steam, do you not think that the same thing in reference to the price of coal will happen again?

Professor JOHNSON. The most of the world's coal is used in the industries rather than on the ocean.

The CHAIRMAN. Is not a very enormous amount of it being consumed in industries and is not that progressing very rapidly in all the civilized countries of the earth—the use of coal for local power?

Professor JOHNSON. Yes; the use of coal is certainly increasing very rapidly.

The CHAIRMAN. It was said some time back—I remember to have heard it stated frequently—that steam power would supersede water power in the movement of machinery. Has that turned out to be a fact?

Professor JOHNSON. I think it has, very largely.

The CHAIRMAN. That is your judgment?

Professor JOHNSON. Yes.

The CHAIRMAN. You are not aware of the fact that water power is more valuable and more in use to-day than it was ten years ago?

Professor JOHNSON. I did not say that, Senator. Water power is being used in connection with electricity, but as compared with steam it is a very insignificant matter even to-day.

The CHAIRMAN. It is growing very rapidly, is it not?

Professor JOHNSON. It is growing rapidly, and will increase undoubtedly.

The CHAIRMAN. Water power went out of use for a while and is coming back, is it not?

Professor JOHNSON. Yes; it is coming back through the medium of electrical transmission of power.

The CHAIRMAN. So that it is another power that is contrasted or compared with steam power?

Professor JOHNSON. Yes.

The CHAIRMAN. Why is it that the people are resorting again to the use of water power for the movement of machinery, the generation of electricity, and all kinds of electrical operation?

Professor JOHNSON. It is because of the progress made in electricity.

The CHAIRMAN. Is it not because of the cheapness of the motive power?

Professor JOHNSON. Made possible by electricity; yes.

The CHAIRMAN. How?

Professor JOHNSON. We are getting water power again because we can transmit it cheaply by electricity.

The CHAIRMAN. Well, whatever the cause may be, it is a fact that the power is being availed of by almost all persons who are engaged in the use of power in machinery, in transportation, and in every other way where it is available. Is not that true?

Professor JOHNSON. Wherever it is possible to economize in power, men will seek for a cheaper force, and electricity is bringing in water power very largely.

The CHAIRMAN. Then I understand that your preference, in reference to the motive power, between these two canals is based on the fact that the Panama Canal is the shortest route, that it is available to steam power, and that steam power is going to supersede sail or wind power in the movement of ships?

Professor JOHNSON. My argument leads to a negative conclusion, Senator.

The CHAIRMAN. To what?

Professor JOHNSON. To a negative conclusion; that is, that as regards the question of the use of the sailing vessel by the canal route, the choice of routes does not depend upon that, because neither route will be used by the sailing vessel to any appreciable extent. That is my conclusion.

The CHAIRMAN. And you base your calculation upon the price of towage?

Professor JOHNSON. I base that calculation upon a large number of factors.

The CHAIRMAN. You have not named any that I have heard yet, except the price of towing ships.

Professor JOHNSON. If that was the only one, that would be insignificant between one route and the other.

The CHAIRMAN. Can you name something that is important?

Professor JOHNSON. Understand me, Senator, I am not arguing for one route nor against another.

The CHAIRMAN. I am not, either. I am here presiding in this committee, with the indulgence of the committee and the Senate, for the purpose of trying to find out the truth.

Professor JOHNSON. That is what I am here to give, if I know it.

The CHAIRMAN. That is all. I have no side to take. I have my judgment, but the evidence might dislodge that, you know. Now, I want to know what other factor besides towage do you put into the problem to determine in favor of the Panama route and as against the Nicaragua route.

Professor JOHNSON. I have not spoken in favor of the Panama route instead of the Nicaragua route in this connection. But my evidence here is simply to show that neither route will be used to any large extent by sailing vessels.

The CHAIRMAN. Now, we want to get at that.

Professor JOHNSON. That is the conclusion I have reached in that connection.

The CHAIRMAN. And therefore you say your conclusion is negative and not positive as to the value of those two canals for the commerce of the United States or anything else—it is a negative conclusion.

Professor JOHNSON. Yes; a negative conclusion that the Nicaragua route is not to be preferred to the Panama route on the ground that it would be used by sailing vessels. That is the negative conclusion to which I come.

The CHAIRMAN. Now, towage is the only element you have mentioned in connection with that negative conclusion. That is the conclusion you rely on, is it not?

Professor JOHNSON. No; as between the two routes the Nicaragua route is the more favorable one for sailing vessels, if sailing vessels are to cross the Isthmus. The Nicaragua route is the better one for the sailing traffic, if sailing vessels are to cross the Isthmus.

The CHAIRMAN. That is what I always supposed.

Professor JOHNSON. There is no doubt about that.

The CHAIRMAN. That is on account of the winds that come into the funnel there and that go out beyond Brito.

Professor JOHNSON. It is on account of the more favorable winds mainly and the contour of the Pacific coast of Central America.

The CHAIRMAN. Well, now, for sailing vessels going to Panama, or for sailing vessels going to Nicaragua, counting out this element in favor of Nicaragua of the pressure of the winds, and so forth, leaving that out of view, then it would be a question of towage entirely. would it not, the cost of towage?

Professor JOHNSON. Well, it would be much shorter. It would take much less time for a sailing vessel to go between our two seaboard by

the Nicaragua route than by the Panama. It is not a question of towage alone.

The CHAIRMAN. The controlling factor is the cost of towage, is it not?

Professor JOHNSON. No; not the controlling factor. The controlling factor would be the time, the relative time, between the two routes; and if you are going to argue for the Nicaragua route from the standpoint of the sailing vessel, your chief argument would be based upon the shorter time it would take.

The CHAIRMAN. If I can get you to leave the argument aside and come down to facts, I want to ask you a question.

Professor JOHNSON. I have stated the facts.

The CHAIRMAN. What is the controlling element in the proposition that either route is as good or better than the other, besides tonnage? What is it? What is the fact?

Professor JOHNSON. I have not asserted, Senator, that one route is not as good as the other.

The CHAIRMAN. I am not asking you what you have asserted.

Professor JOHNSON. I wish to state what I have asserted, Senator.

The CHAIRMAN. Well, you can state it as often as you want to. I have no objection to your doing it. I am trying to get at the facts, and I want you now to state to this committee what element it is besides tonnage that is a controlling factor in the choice of one route over the other.

Professor JOHNSON. The Nicaragua route is the more favorable one for the passage of sailing vessels.

The CHAIRMAN. Leaving that out of view, is there any other fact except the cost of towage?

Professor JOHNSON. Those are the two factors, the time it takes, and the cost of towing.

The CHAIRMAN. That is what I wanted to get at. I supposed it was a very simple proposition.

Senator HANNA. He stated that plainly enough before. I understood it.

The CHAIRMAN. So if we can get sailing vessels through the Nicaragua route, would not the fact that sailing vessels are thus provided with a way of getting through add largely to the commerce between the Pacific and Atlantic coast?

Professor JOHNSON. The whole evidence convinces me that the sailing vessel would not use either route.

The CHAIRMAN. I am asking my question upon a hypothesis that you are not willing to admit, I know. I am not asking you about the propriety or the value of my hypothesis, but I am stating the hypothesis and asking you for your opinion, based upon that hypothesis.

Professor JOHNSON. I have no opinion upon that hypothesis.

The CHAIRMAN. Would you not suppose that it would add to the value of this canal, or either canal, if sailing ships could go through?

Professor JOHNSON. I should say no, it would not, because I think it is very evident that through neither route could the sailing vessel compete with the steamer, so the whole argument for choice of routes on the basis of the availability or nonavailability of the route for sailing vessels has no point, in my mind.

The CHAIRMAN. If a man at New Orleans, or on the Mississippi River, or a company, owns sailing ships and wants to sail them to San Francisco or to San Diego, would it not be of advantage to that man

if he could get through one of these canals instead of going around the Horn?

Professor JOHNSON. That man would find the sailing vessel a much more expensive agent for transporting traffic between those two points than a steamer.

The CHAIRMAN. He owns the vessel and does not want to buy a steamer. Would it not be of advantage to him to have the opportunity of going through one of those canals?

Professor JOHNSON. No; I should say it would be to his advantage to sell his sailing vessel and to build or charter steamers for that traffic through the canal.

The CHAIRMAN. Then your proposition implies the notion that those who own sailing ships had better sell them and take up steam traffic or hire steam traffic.

Professor JOHNSON. Yes; after the canal is opened the sailing vessel will not be an economical carrier through the canal.

The CHAIRMAN. Suppose the Government of the United States could derive enough revenue from this source, or failing to derive revenue enough from this source should feel a generosity toward her sailing ships engaged in the coastwise trade sufficiently great to offer them free towage or assume to pay the towage herself upon her own ships running through the canal, would you not then consider that there might be some advantage to the sailing vessel if she got her towage free?

Professor JOHNSON. That would be a certain advantage, but it would not enable the sailing vessel to compete with the steamer.

The CHAIRMAN. It would not?

Professor JOHNSON. No, sir.

The CHAIRMAN. Still, would it not enable the sailing vessel in a very large degree to compete with the transcontinental traffic of the railroads?

Professor JOHNSON. The steamer could compete more easily than the sailing vessel.

The CHAIRMAN. Very good; but suppose you have those two factors in competition with a third, and in competition also with each other. Would not that lead necessarily to a reduction of freights in favor of the people?

Professor JOHNSON. You prefer to have me answer directly, and I will say no; because in order for that to take place you would have to have a combination of sailing vessels and a combination of steamers, and then competition between two combined forces.

The CHAIRMAN. In your investigation of this subject have you found any difficulty in finding combinations between steamers?

Professor JOHNSON. There is competition all the time in the chartering of vessels.

The CHAIRMAN. You have mentioned combinations.

Professor JOHNSON. There is active competition in the chartering of vessels.

The CHAIRMAN. You have mentioned combinations.

Professor JOHNSON. I have mentioned it because I say, if your supposition be true, you would have to have the steamers combine over a given route.

The CHAIRMAN. Is there any difficulty in getting up a combination between them when their interests are involved?

Professor JOHNSON. Yes; there is in the freight business, because the freight of the world moves ordinarily in tramp vessels—in chartered vessels—and the charter business is under the severest kind of competition.

The CHAIRMAN. You are aware of the fact that the transcontinental railroads for many years have had a combination with the railroad across the Isthmus of Panama?

Professor JOHNSON. They had a traffic arrangement, yes; but it has expired.

The CHAIRMAN. After that long experience, at great cost to the people, do you suppose that there is any difficulty in renewing such contracts?

Professor JOHNSON. I suppose a contract like that could be renewed; yes.

The CHAIRMAN. Well, that contract included every transcontinental railroad, did it not, from Canada down to the Isthmus of Panama?

Professor JOHNSON. The contract you refer to I believe was between the Panama Railroad Company and the Pacific Mail.

The CHAIRMAN. That lasted for many years.

Professor JOHNSON. Yes. I do not know of any other contract.

The CHAIRMAN. You do not suppose there would be any difficulty, do you, in getting up combinations between the railroads and steamship companies for the purpose of pooling their freights and pricing them to suit themselves?

Professor JOHNSON. I should anticipate that there would be a great difficulty in controlling the rates between the Atlantic and Pacific seaboards.

The CHAIRMAN. Do you know whether any such combinations exist now?

Professor JOHNSON. Not that I know of; no, sir.

The CHAIRMAN. Have you heard of none?

Professor JOHNSON. I have heard of none..

The CHAIRMAN. Have you examined that subject?

Professor JOHNSON. I have always had my eyes open on that subject.

The CHAIRMAN. That was a legitimate and proper subject for your examination, was it not, as a member of the Isthmian Canal Commission?

Professor JOHNSON. Yes, and I conferred with the steamship people, the American and Hawaiian Steamship Company, which does the business around through the Straits of Magellan, and I conferred with a number of railroad companies.

The CHAIRMAN. How about the ships between San Francisco and Panama? Did you confer with those or examine into them?

Professor JOHNSON. The Pacific Mail?

The CHAIRMAN. Yes.

Professor JOHNSON. No, sir; I did not see the Pacific Mail people, except through men connected with the Southern Pacific Railroad.

The CHAIRMAN. Was not that an important part of the inquiry?

Professor JOHNSON. You remember that that contract between the Pacific Mail and the Panama Railroad and Steamship Company terminated in December, 1900.

The CHAIRMAN. I believe I have no further questions.

Professor JOHNSON. The only other topics on which I might give information are in regard to tonnage and the question of tolls, and this will be published in full in the report.

REPORT

OF

SEÑOR TANCO ARMERO,

AGENT OF THE GOVERNMENT OF COLOMBIA TO INSPECT
UNIVERSAL INTEROCEANIC CANAL COMPANY,
AT PANAMA, FOR 1887,

MADE TO THE MINISTER DE HACIENDA OF COLOMBIA.

REPORT OF SEÑOR TANCO ARMERO, AGENT OF THE GOVERNMENT OF COLOMBIA TO INSPECT THE UNIVERSAL INTER-OCEANIC CANAL COMPANY, AT PANAMA, FOR 1887, MADE TO THE MINISTER DE HACIENDA OF COLOMBIA.

Translation by Maddin SUMMERS.

REPORT.

MR. MINISTER: Last year I had the honor of presenting to your excellency a résumé of the work on the Interoceanic Canal, defining the origin of the enterprise, the constitution of the company, the state of the works, and giving a slight idea of the future of this colossal undertaking.

And now, after having examined closely the line of the canal, studied carefully the works, forming thereby an exact idea of the whole matter, and after having succeeded further on in collecting positive data upon the most important points of the technical, administrative, and executive features of the work, I can now, with a reasonable degree of certainty, respectfully present my observations to your excellency, rectify my former reports, and complement my work.

The annual reports presented by the Count de Lesseps, president of the company, to the general meetings of the stockholders throw much light upon the situation, and, as official documents, are the only means of misleading the public; but by such desire to mislead the stockholders, these documents, though concise, by the very fact that they were official, and on account of their partial nature, do not have the precision which is necessary in the premises, nor do they give an exact idea of the situation.

On the other hand, what has been written by pessimists and detractors of the company is very rash, exaggerated in the highest degree, inexact, and merits no attention whatsoever. For this reason it is indispensable that some disinterested person, well informed in the whole matter, should explain the situation and tell the true state of affairs, supplementing his explanation with positive facts based upon figures presented by the company itself, whose elucidation is indisputable and undeniable.

In my opinion, no one is better qualified to perform this mission than the agent of the Colombian Government, and this is what I propose to do in this report.

The administration of the company, organized from the very beginning with such elaboration, has since remained in an embryo state, or, better said, it has continued in its deficient and imperfect condition.

It is a veritable machine, composed of many complicated wheels, never at any time performing well its functions, becoming discomposed with great frequency, and without motive power. In less than seven years there have been ten or twelve directors of the work in Panama, and at times persons have directed the company who were neither engineers nor had they ever before directed an enterprise of this nature. By reason of this system of constant changes and the lack of harmony between the different directors, there never existed the necessary cooperation so indispensable for a work of this nature, nor the economy so necessary in the management of large capital pertaining to every class of associated work, and thus resulted the enormous sums spent, from the very beginning, the frauds practiced upon the company by the fatal system of "pointage," or estimates of the work, and the litigations and vexatious questions that were designed for the sole purpose of extracting money from the company and for exploiting it.

The system of "economat" which was established lasted only a short time, when the accounting system was changed and was substituted by one called the "contabilidad materia." Some months later it was again changed, being called the "division del material," and finally was modified again and baptized with the name "Servicio de abastecimientos" (provisions).

Such variation in this branch, and in many others, has greatly injured the company and the administration, yet to-day all has been regulated, a system of order has been introduced in all the warehouses and depositories, exact inventories have been made, and the accounts are carried with greatest care.

The immense office force of the company and the multitude of useless employees receiving large salaries has been greatly reduced, and the last directors have introduced important economic reforms in the administration. The fact is that there is some talk of removing the office to Colon, a step very inexpedient and one that will entail great expense to the company, produce a storm of dissatisfaction, and severely injure Panama. It is to be hoped that a person of such judgment as the present director will not insist upon carrying out this plan.

According to the plans, the number of cubic meters to be excavated in order to open the canal was 143,000,000, and to these figures must be added the quantity of earth to be removed in order to lead off the waters of the Chagres, Obispo, and Grande rivers, which amounts to 18,000,000 cubic meters, making the total excavations amount to 161,000,000 cubic meters, and, as the amount taken out up to the end of August of the present year was 33,925,230 cubic meters, according to the figures of the company, there yet remain 127,074,770 cubic meters to be removed. As up to date the sum expended is 818,032,900 francs, it is evident that the cost per meter of the work has been exorbitant. Were we to base our calculations on these figures, the total cost of the canal would become fabulous, and would probably never be finished. But the calculations should not be made in this manner. We have to look at the costly preliminary work, the enormous price paid for the railroad, the immense amounts of materials which had to be collected, and the purchase and erection of buildings, all of which were expenses which had to be met in order that a work should progress which is probably the most colossal of modern or any time.

On the other hand, it is true that the earth removed up to the present time has been by far the easiest, by reason of the fact it was on the surface—called by engineers the “pista;” but as the lower ground is reached the work will be more difficult and costly. It can be truly said that eight-tenths of the earth removed up to the present time has been vegetable matter, such as will not be encountered as the work progresses. And take into consideration the character of the ground along the canal route. With the exception of the section from Colon to Gatun, along which is encountered nothing but clay and such materials as are thrown over by the river Chagres from Mamei and Gorgona, Corozal, and Paraiso, all the other sections are composed of nothing but rock, an example of which is “La Culebra,” a mountain which is no more than a mass of rock.

We must equally take into account another difficulty which will be presented, namely, that of removing the rubbish and débris in order that the work of excavating may progress, the removal of which will be difficult and costly.

At the Culebra section, hills 339 feet above the sea level had to be pierced, and here the quantity of rock and earth to be removed reached gigantic proportions.

At least 15,000,000 cubic meters must be transported about 18 kilometers and thrown into Panama Bay, as the valley of Paraiso will be filled when 8,000,000 meters shall have been thrown there, and the same will be true of Emperador and Obispo. It will therefore be necessary to construct various railways to remove the excavated earth, the cost of which will be considerable.

The works on the Chagres River, scarcely begun, will present the greatest difficulty, and will be the most costly part of the canal. The dike or gigantic dam projected to contain the waters will be a stupendous undertaking—a work of the Romans. It is calculated that it will be 1,200 meters long, 430 broad, and 45 high, and behind it will be banked up 3,000,000 cubic meters of water.

The hills on which the flanks of this gigantic dam will rest will be tunneled, and through these tunnels will flow to another watershed the water which otherwise would follow the course of the canal, and they will find their way to the sea at points many miles distant from their former outlets.

This is found to be the best method to prevent the damages resulting from the great rises and overflows of the river. But how much will this work cost? The company has never been able to fix this amount definitely, but it is evident that it will cost an enormous sum.

In Gamboa there is not sufficient rock necessary for the construction of the canal, and it will be necessary to bring it from Obispo and to construct a railroad for that purpose, and also to transport the other materials from Emperador, Las Cascadas, Matachin, etc.

According to the estimates submitted us by an engineer, the regulation of the course of the river Chagres will cost \$94,340,000, or 471,000,000 francs.

The price that has been paid per cubic meter has been an average of \$1.50, but to this must be added the expenses incident to the administration, which raises the average price to at least \$2 per cubic meter. This price has been paid for the excavation of the easiest portion of the canal, and the remaining 127,074,770 cubic meters will cost double this amount. And so it is seen that, for this alone, there will be neces-

sitated the expenditure of the enormous sum of \$508,299,080, or 2,541,495,400 francs.

Adding to this the cost of the dam at Gamboa, that is to say 471,000,000 francs, and a total expenditure of 3,012,495,400 francs will be necessary.

This is the mountain of gold which will still be required to make a good canal, without taking into account that the company will have to pay the interests on the capital invested, together with the general expenses, which, if the work is delayed six or seven years, will easily reach another billion of francs.

The quantity of material owned by the company is immense. Without counting in the railroad which is so useful to the company, it owns an infinity of excavators, engines for the embankment works, locomotives, movable excavators, hoisting gear on wheels, etc., and a whole fleet of dredges, steam launches, tugs, boats, launches, etc., and every piece of machinery it is possible to employ either afloat or ashore. Up to the present time the Deauville waggonets have been mainly employed in dry excavation, for the French and American machines have not given satisfactory results and, in the water, the Deauville machines have been employed to the greater advantage.

They consist of two pieces only, the wagon bed resting on four wheels and made of sheet iron fitted together with bolts, and having a capacity of a half a cubic meter, thereby requiring but two men to manipulate them. These small machines have been very useful, more so than the large ones, which, by reason of their great weight, have been inadequate for the work, and the strength of the men was not sufficiently strong to put them into motion. It can be truly said that one-half of the excavations made up to the present have been made with these little machines.

The dredges are even more curious. Each one possesses seven engines, which in all generate a motive power of 300 horsepower, more or less. Two of these engines move the chain of dredging shovels, other two move the hull of the boat with a force of 30 horsepower, and two others are employed in drawing up and letting down the dredging shovels, the last one being used for the machine to root up the stumps of trees. Then two small fire engines, with one large cylinder and a force of 40 horsepower, are employed to throw a stream of water in the dredging shovels while suspended in the air for the purpose of precipitating their contents, and when it is found that the contents of the dredging shovels are easily emptied it is customary to employ only one of the engines.

Three large boilers generate the steam necessary for all these operations, and are fed through the condenser.

It is calculated that 2 tons of coal are consumed by each dredge during ten working hours. The materials excavated are lifted to a height of 45 feet above the line of the canal and are emptied in a tube 8 feet in diameter and 150 feet long.

While working the dredges are situated at a distance of 15 meters from the banks of the canal.

The shovels have a thickness of 0.013 meter and contain 0.79 cubic meter of earth and move at the rate of 13 buckets of dredged matter a minute, excavating at this rate 7,584 meters in ten hours of work.

The dredges situated on the Atlantic side (those of the Slaven Company) are those that have done the best work up to date, those situated

on the Pacific side having been subjected to various damages this year. and in this way retarding the work.

As is easily seen, it is not the material that is lacking, the company being provided with as much as is necessary for this work; but there is a great scarcity of employees, for the company has never exerted itself sufficiently to obtain them, the result being that many machines have stopped work, rusting and wearing out by the action of the climate, and soon will not be fit for service.

The company reported that the mean of a man's work per day amounts to 5 cubic meters, but if this be so it becomes evident that, if up to the present only 1,000,000 cubic meters per month have been removed, it is impossible there could have been 8,000 men at work. I firmly believe, and without risk of erring, that there have never been more than 5,000 men employed, and the work done confirms this belief. If work were executed equal to that which 615,000 men could do, then by only working three hours per month they would move 1,000,000 cubic meters. Then 3,075,000 cubic meters would be removed daily or 92,000,000 in thirty days and the canal would be finished in one month and a half. This is flattering, but purely illusory. The truth is that the greater number of the working sections are almost deserted, and the laborers seen on the works are very few compared to the number which should be employed.

In a work of this sort, where time is so important a factor, laborers in abundance should have been obtained from the very beginning, and from 30,000 to 40,000 workmen should have been employed. The funds were sufficient and should have been employed for that purpose, and if the vast sums of money that have been wasted in the employment of servants for their own uses had been devoted to the end in view the canal would now be well under way, whereas no one now has the remotest idea of when it will be finished.

In the report submitted by Mr. de Lesseps, the 21st of July, to the general meeting of stockholders, he dedicates, as is his custom, a chapter to giving an account of the operations of the railroad during the past year. He announces to them that the burnt docks had been rebuilt, that the wooden bridges had been replaced with steel ones, that the construction of railway stations had been terminated in Panama and Colon, and that various other improvements had been made in the line. In addition, he informs them that 20 kilometers of the road had been rebuilt, the iron rails being replaced with steel ones, and finally gives a report of everything relative to the exploitation and traffic of the enterprise.

Notwithstanding the fact that it was a prosperous year, during which there was a large passenger trade and equally large freight movement, yielding more than \$3,000,000, the net receipts scarcely reached \$118,000, and the dividends which were paid to the stockholders was only 2 per cent.

The president of the company stated that the earnings which would have been passed to the stockholders had been credited to the reserve account, as he stated that it was highly important that preparation should be made for commercial exigencies.

When the Government of Colombia instituted its reclamations for the noncompliance of clause 3 of the contract, the company refused to entertain such reclamations, stating that it was only a stockholder in the railway. If this were so, it is difficult to see why the company

should give such minute accounts of the working of the road, nor pre-occupy itself with the exigencies of the commercial traffic, but it would seem that a simple declaration of dividends would have been sufficient.

But the truth is that the railroad is an annex of the canal company; that it is its property, inasmuch as it bought the same, and its action in distributing a few shares among foreign hands is clear and evident. To Colombia it may say that it is not the owner of the canal, for it suits their purpose, but to the stockholders and the public it is forced to tell the truth.

Of the 70,000 shares composing the railroad company's capitalization, the canal company bought 68,534, leaving 1,466, considering doubtless that this curious number would be indispensable to the maintenance of the enterprise as an American company, when in reality the railroad company belonged to the canal company.

It is also worth noticing that, although shortly before the railroad shares had been quoted at \$80, the canal company bought them at \$250 gold each, with \$14 added for interest. From these figures I deduce that the railroad company made by the operation \$13,650,880, without counting the interest, and to one-half of this sum Colombia has a right, or at least an equitable indemnization, and which the Government under the contract has the right to determine. Up to the present, however, Colombia has not received one cent, but, sooner or later, one or the other of the two companies will have to pay this sacred debt, for equity and justice are universal laws and principles.

There is nothing that illustrates the condition of an enterprise so well as the state of its finances and the resources upon which it can count to carry out its ends. The French call money "the nerve of war," and the English know it by the synonym "power," and in no cases are these appellations seen better than in commerce and immense industries. In this day and time there is no such word as "impossible," for the human mind, assisted with that great power, wealth, can overcome all obstacles.

Let us now see the situation of the company.

The last report which the Count de Lesseps made to the general meeting of stockholders contained, as is customary, only the financial situation of the previous year, and the figures are given in such lump sums that it is impossible to form any idea of the true situation.

According to these documents, we find the following:

<i>Receipts.</i>		Francs.
Capital on June 30, 1885.....	241,971,552.39	
Less bills payable	24,729,260.15	
Capital on hand.....	217,242,292.24	
Add to this sum 4 per cent bonds sold and other receipts.....	20,994,259.42	
Total	238,236,551.66	

<i>Expenditures.</i>		
Company's expenditures, management, and work at Panama.....	117,812,935.89	
Material bought.....	26,498,182.70	
Total	144,311,118.59	

The difference between the receipts and expenditures thus shows a balance on June 30, 1886, of 93,925,433.07 francs, and, according to

the general balance sheet of the company on this date, the cash balance was 772,545,412.99 francs.

Believing that it will be of interest to the reader, I have formed a detailed account of said balance, availing myself of the data furnished by the company in order that it may be clearly seen how and in what the directory of the company has expended more than enough money to complete the canal.

I shall now explain the situation up to this date, the 1st of September, availing myself of such data as I have in my possession and of that contained in said report of the company.

In 1880 the company was formed in Paris with a capitalization of 300,000,000 of francs, divided into 60,000 shares of 5,000 francs each. In 1882 the company contracted a loan, and issued 250,000 bonds bearing 5 per cent interest, which were sold at 437½ francs, to be redeemed at their face value. In 1883 it again issued 600,000 3 per cent 500 franc bonds, which were sold at 125 francs. In 1884 it issued 409,667 4 per cent bonds at 333 francs each, also to be redeemed at face value. In 1886 another 500,000 shares were offered, of which 458,802 were sold at 450 francs, to be redeemed in forty-two years at their face value, 1,000 francs, and bearing interest at 3 per cent. These bonds produced 206,460,900 francs. And lastly, in August of the present year, another loan was made; 500,000 bonds were issued, of which 258,887 were taken up at 440 francs, repayable in forty-eight years at 1,000 francs. This produced 113,910,281 francs.

The company has therefore received in cash the enormous sum of 1,031,943,180 francs, and, as Count de Lesseps informs us there were still on hand 100,000,000 francs of the August loan, there should be altogether to-day in the treasury 213,910,280 francs. By deducting this from the former amount we find the company has already expended 818,032,900 francs. And it must be remembered that the expenses of management, interest, etc., amount annually to 100,000,000 francs, which sum will continually augment now that additional interest has to be paid on the new loans, and, as we have already proved, 3,000,000,000 francs more are required to meet the expenses of excavation, construction, etc. Thus we are compelled to reflect that the company will annually obtain less money, even should it offer higher interest, and it is absolutely necessary to feel convinced that it will be difficult to obtain the fabulous sum required, and the more so by reason of the fact that the condition of the company is serious and alarming.

I have already in my previous report proved that the traffic through the canal from the first year that it is opened will be much greater than has been estimated, and Count de Lesseps corroborates this assertion in his report to the shareholders. The Statistical Congressional committee estimated the Australian and New Zealand traffic at only 300,000 tons per annum, but figures compiled by Mr. Ballantyne in Melbourne show that they will exceed 9,500,000 of outward and inward cargo. Kelly and Van Nehus calculate the trade between Europe and the Pacific at 20,000,000 tons, and they anticipate that at least one-half of this will pass through the canal.

The fact is that I can not see why all this trade should not pass through the canal, and besides, a large part of that of the Orient. Commerce always employs the shortest route, for in addition to a saving in the time employed there is also a saving in the price of transportation.

Once that the canal is opened, all the immense quantity of flour shipped annually from San Francisco to Europe will naturally employ the new route by reason of its shortness. This traffic alone is estimated at 30,000,000 of bushels, employing 500 vessels, whose voyages at present around the Cape Horn are attended with great danger. The average length of the voyage is 16,000 miles, and the time consumed more than four months, whereas through the canal a steamer can make the trip in less than one-half of the time.

Again, all these vessels would pass through the canal on the return voyage in the same manner as is seen in the case of vessels transporting grain from India through the Suez Canal, and thus the company will realize the passage fees of a thousand boats. Supposing that each boat will average 2,000 tons, we would then have the sum of 2,000,000 tons passing yearly through the canal, and from this traffic alone the Panama Company would realize from the first year the sum of 30,000,000 francs.

Even the vessels leaving New Zealand will find it to their advantage to adopt the route through Panama. For example, a vessel sailing from Auckland to Liverpool, passing through Sues, will have to travel nearly 13,000 miles. By Cape Horn the route is about 600 miles shorter, and by Panama, the distance is only 11,500 miles. Although the saving of time is not very considerable, nevertheless it is always an advantage.

Besides, one has to take into consideration the fact that vessels sailing from Europe to the western coasts of America, to Japan, the north of China, the Sandwich Islands, and Australia at present have to double Cape Horn, a route not alone of great length, but also very dangerous, and for this reason the insurance companies exact high rates, thereby causing very high freight charges.

The Panama Canal will not alone shorten these distances, but it will also enable vessels to avoid the route through the Straits of Magellan, resulting thereby in a reduction of freight rates.

The European countries never take into account what the South American countries can contribute to the traffic of the canal. As is their custom, they depreciate this source, and do not give any importance to the amount of traffic which these countries can contribute. This is not just, and we believe, on the contrary, that they will greatly assist in furnishing trade for the canal in proportion as their natural products and riches are developed.

Chile, Peru, Ecuador, Colombia, all these Republics are anxiously awaiting the opening of the canal in order to inundate Europe with their sugar, coffees, tobacco, dyes, saltpeter, guano, cotton, sarsaparilla, cocoa, woods, and an infinite number of natural products so necessary for the maintenance of human life as well as useful for industrial purposes. They can also figure conspicuously in the markets of the world with their metals and stones hidden now in the deep and abundant mines and shafts.

The very probability that the canal would be finished within a few years has awakened the spirit of enterprise, and all men of spirit and push are preparing to avail themselves of its advantages the very day of its inauguration.

According to the reports of Mr. De Lesseps, the large steamship companies are augmenting their flotas, and the Marquis del Campo, the prince of the Spanish Armadas, is ready to inaugurate a new line

for the Pacific trade. All countries are awaiting the outcome of this canal, which will not alone cause activity in all commercial lines, but will also revolutionize the world.

The Panama route, designed by nature for the communication between nations of the world, assisted even by the winds and the currents of the sea, which follow the course of the sun, will be adopted by all nations, especially by Oceania, Japan, China, etc., and those great emporii of riches, known in Europe as the Far East, will, upon opening the canal, form only the limits of the west.

Panama will then be converted into a true center of the world's commerce, and this strip of Colombian territory, endowed as it is by nature with great and exceptional natural advantages, will embrace within its shores the products of all climes and all nationalities to scatter them hence from American soil to the uttermost confines of the globe. That day will be memorable as marking the apotheosis of Columbus, Washington, and Bolivar, who from the glorious trinity which symbolizes the discovery, the progress, and the liberty of the New World.

The questions that have arisen this year between the Government and the canal company have been satisfactorily arranged in this capital. The authorities are lending decided aid to the enterprise, and are giving them every means of security in order that the work on the canal may progress with system and order. If for any reason they fail, it is because of their overanxiety and solicitude for the company, as happened in the case of the great contractor, Papis, whom the Government, at the instigation of the company, ordered to leave the neutral grounds of the canal before the proper judicial warrant had been obtained. It is to be hoped that the company will pay the \$400,000 indemnity asked on this account and relieve Colombia of many disagreeable questions that may arise.

The representative of the company in this capital recently addressed a memorial to this department requesting that the company be ceded 100,000 additional hectares of unappropriated land, which request was granted, and not long since a special agent was sent on a mission to Bogota to treat of the matter.

In the appendix to this report has been published a work of Mr. Crozes, and the resolution that was passed relative to the different questions that have arisen from the beginning of the work between Colombia and the canal company. It was thought advisable to do this, as these documents could, in this manner, be better studied.

I propose to prepare another report on the railroad company, which I think will be of special importance.

In conclusion, Mr. Minister, I will repeat what I have before had the honor of stating to your excellency: The canal will be built. The works are now far advanced, and it is impossible that those hundreds of millions which have been spent in its construction should be permitted to be lost; furthermore France's honor is pledged to the termination of this work, so useful to the commerce of the world, so beneficial to the interests of mankind.

It is not merely an industrial business manipulated by a vast company, it is a work of a universal nature. A half million of shareholders of all nationalities have invested their savings in this enterprise, the entire world has assisted in this plebiscite of immense capitals; and Mr. De Lesseps, the great Frenchman, will succeed, we do not doubt,

with his prestige and influence, in overcoming all obstacles and avoiding a catastrophe which would be fatal to his name and ruinous to the legion of his friends and admirers.

But what is evident is that with the system that has prevailed up to the present time, and at the rate at which the work is now progressing, the canal will not be built in ten years, and during this lapse of time the interest alone on the indebtedness will have devoured the company.

NICOLAS TAÑCO ARMERO.

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THE BAY OF PANAMA SAILING DIRECTIONS.

THE BAY OF PANAMA SAILING DIRECTIONS.

DEPARTMENT OF THE NAVY,
BUREAU OF EQUIPMENT,
Washington, D. C., March 12, 1902.

SIR: 1. Replying to your letter of the 10th instant, requesting information concerning the navigation of the bay of Panama to and from the Pacific, referred by Rear-Admiral Crowninshield to this Bureau, to which such matters pertain, the Bureau forwards herewith page proof of that part of Hydrographic Office Publication No. 84, "West coast of Mexico and Central America from the United States to Panama, including the gulfs of California and Panama," covering the navigation of the gulf and bay of Panama.

2. The above-mentioned publication is now in the hands of the printer and is the result of careful revision of all previous publications on the subject treated.

3. There is also forwarded under separate cover Hydrographic Office charts Nos. 1019, "West coast of Central America, Morro Puercos to Cocalita Point," and 1176, "Coasts of Colombia and Ecuador, Panama to Cape San Francisco," to which charts the inclosed remarks refer.

Very respectfully,

R. B. BRADFORD,
Chief of Bureau.

Hon. JOHN T. MORGAN,
United States Senate, Washington, D. C.

CHAPTER XIII.

THE GULF AND BAY OF PANAMA—PEARL ISLANDS.

VARIATION IN 1902.

Cape Mala.....	5° 41' E.	Piñas point.....	4° 58' E.
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General description.—Cape Mala on the west and Piñas point on the east may be considered the limits of the gulf of Panama. The line between these points, running nearly east and west, is 105 miles long, and within this line the gulf extends to the northward 92 miles, with the bay and city of Panama at its head. Between the entrance points the 100-fathom line curves slightly to the northward, the depths outside increasing rapidly to 1,000 and 2,000 fathoms, while within they decrease gradually to the head. The Pearl islands are entirely within the 50-fathom line.

The isthmus of Panama, which encircles the gulf, is the narrow neck of land connecting the continents of North and South America; in a restricted sense the name is applied to the narrow crossing between Panama and Colon, the two other narrowest crossings being distinguished as the isthmus of San Blas and the isthmus of Darien; the widths of the isthmus at these points, in the order here given, are, respectively, 31, 27, and 32 miles, the last distance being measured from the head of deep-water navigation at the mouth of the Savannah river in Darien harbor.

The whole isthmus is comprised in the Department of Panama of the Republic of Colombia, this department extending from the Costa Rican boundary to the department of Cauca. All the departments of Colombia, except Panama, are included in South America. The total population of Panama in 1881 was 285,000 persons.

Climate.—The geographical position of the isthmus of Panama, the absence of high mountains, and the vast extent of forests and other uncultivated parts, tend to produce a hot and rainy climate, which, nevertheless, with the exception of a few localities, as Chagres, Colon, Porto Bello, is said to be healthy and more favorable to Europeans than that of most tropical countries. Diseases of the digestive and integumentary systems are common, and malarial fevers, often of a most pernicious type, prevail throughout the year. The rainy season is the most unhealthy, especially at its

end when the weather is changing. Yellow fever has prevailed at times in an epidemic form. On board ship, Panama is the most healthy place on the coast of Central America; vessels of war have remained here many months at a time, their crews continuing in a healthy state.

The wet season begins in May and lasts till November. The rains gradually increase until the season is fairly established in June, and continue through July, August, and September, with strong southerly winds. In December the rains cease; the NW. and NNW. winds set in, producing an immediate change. During the dry season regular land and sea breezes blow. The sea breeze sets in about 10.30 a. m. from SSW., generally increases in force until about 3.30 p. m., then gradually subsides, and at sunset is followed by a calm.

About the end of June, the rains are suspended for a short time, the occurrence of this phenomenon being so regular as to receive the name of Veranito de San Juan. The average temperature of the year is very high.

Winds.—The navigation of the approaches to the gulf of Panama is for a sailing vessel one of the most tedious, uncertain, and vexatious undertakings known to the seaman. Between cape Corrientes (latitude $5^{\circ} 30' N.$) and Panama the prevalent winds are from the northward and westward, with frequent squalls from the SW. between the months of June and December. In the gulf of Panama the winds are regulated by the seasons; the prevalent wind, however, is from the northward. In the fine season, commencing in December, the winds are regular and constant, bringing fine, dry weather. To the southward of the gulf they blow much harder, and off the coast of Veragua* a double-reef topsail breeze in January and February is not uncommon. In April and May the northerly winds are less regular and have more westings in them, with calms, light sea and land breezes, and occasional squalls from the southwestward. In June the rainy season sets in and the southerly winds become stronger; still the northwest wind is mostly found after noon, and vessels sailing from Panama will generally have, at all seasons, a fair wind until south of cape Mala.

Between the Galápagos islands and the coast, westward of the meridian of $80^{\circ} W.$ and south of the parallel of $5^{\circ} N.$, the winds are between south and west all the year round, and, except between the months of February and June, they are of sufficient strength and duration to make navigation easy; but northward of latitude $5^{\circ} N.$ and between $80^{\circ} W.$ and $110^{\circ} W.$ is a region of calms and doldrums, accompanied by rains and squalls.

*Province of the Department of Panama lying between the isthmus of Panama and the isthmus of Chiriqui.

Currents.—The gulf of Panama is subject to irregular currents, partly caused by the formation of the land and partly influenced by the Peruvian and Mexican streams, according to the varying strength of each. Malpelo island, which lies about 230 miles S. 25° W. of cape Mala, is surrounded by strong and rapid currents; these have been observed to set in opposite directions, sometimes to the NE. and sometimes to the SW. A steady current has been found to set to the northward after passing cape San Lorenzo, at the rate of 24 to 36 miles per day, extending offshore about 60 miles. This stream runs along the coast, following the direction of the land, enters and makes a complete circuit of the gulf and the bay of Panama, and then sets with considerable force, especially in the dry season, to the southward down the western side of the gulf. After passing cape Mala it meets the Mexican current from the WNW., causing tide rips, eddies, and the short choppy sea met with at the entrance to the gulf.

West coast.—**Cape Mala**, which forms the western point of entrance to the gulf of Panama, is a low but cliffy point with outlying rocky ledges, having deep water close to them. The land from the NW. slopes gradually down to the sea at this point from a considerable distance, making the exact cape difficult to distinguish unless the breakers are seen. On opening the gulf around this cape a strong southerly set is generally experienced, especially in the dry season.

Iguana island, lying about 9 miles to the northward of cape Mala, is a little higher than the adjacent coast, and thus forms a conspicuous object. A ledge extends about 600 yards from its south point, and the chart indicates a reef as extending about 2 miles ENE. from its east point; also, in 1858, a reef was reported to stretch to the NNE. from its north point; but otherwise the island is steep-to, with 15 fathoms in the channel of about 1 mile in width between it and the main.

Tides.—High water, full and change, at Iguana island is at 4h.; springs rise 15 feet. The flood sets to the northward and the ebb to the southeast, the latter being considerably the stronger, especially between the months of December and June.

Parita bay, nearly 20 miles wide and open to the eastward, lies within Lisa and Antoine points, the former point being 38 miles NW. of cape Mala, and the latter 40 miles SW. of Chamé point. From the cape to Lisa point the shore is a hard bank with sandy beach in front; at the point mud flats begin and extend around the western side of the bay, the coast being a low mangrove shore, intersected by the mouths of no less than five small rivers; the land to the westward is also low, with several hummocks. The coast between the bay and Chamé point is a continuous beach,

named Playa Grande, in front of a low wooded bank. There is a depth of 4 and 5 fathoms about 2 miles off this beach, except S. 22° E. (S. 27° E. mag.) of the Cerro Chamé, where there is only about 4 fathoms at nearly 7 miles from the land, the bank extending from here to Chamé point.

Otoque and Bona islands, with Estiva islet and Redondo rock, lying 6 miles southeastward of Chamé point, form a group similar but smaller than Taboga and Taboguilla, being cultivated and having a considerable village, named La Goleta, in the bay on the western side of Otoque. Otoque and Bona are high and peaked, and form good landmarks for vessels entering this side of the bay. Anchorage in from 10 to 14 fathoms may be found in any part of the group, and all dangers are above water.

Chamé bay, at the head of which is a small river of the same name, is nearly filled with large mud banks, the largest, the Cabra Loma, lying in the middle of the bay and on it Tabor island. Chamé point, the southern horn of the bay, is a singular low woody projecting peninsula, 5½ miles long and ¼ mile wide; between it and Cabra Loma bank is a convenient harbor, 2 miles long by ¾ mile wide, with from 3 to 8 fathoms water, there being 16 to 18 feet close to the beach.

Coast.—The coast from Chamé point to Bruja point, a distance of 16 miles, forms a shoal bay with several outlying banks and rocky islets, and vessels bound to Panama should therefore keep near the island of Taboga and not approach this shore within the depth of 5 fathoms. The Rio Chorrera discharges at the head of the bay, about 15 miles southwestward of Panama, and on the river, at about 17 miles from Panama, is the town of Chorrera, 180 feet above the sea, with nearly 5,000 inhabitants. Vique cove, with a small village, is 5 miles westward from Bruja point. About a mile NE. of Vique is a lofty treble-peaked hill 1,610 feet high, named Cerro de Cabra, a conspicuous object for vessels bound to Panama, and frequently mistaken for Taboga by those coming from the eastward.

Valladolid rock, with 10 fathoms close-to, lies 6 miles north of Otoque island and 6½ miles NE. of Chamé point.

Chamé island lies 2 miles NE. of Valladolid rock, with 7 to 10 fathoms close outside. Perique rock lies close to the north extreme of the island.

Taboga island, with the islands of Urava and Taboguilla, forms a pleasant group, about 4 miles by 2 miles in extent, lying 9 miles south of Panama. Taboga, the highest and largest island, 935 feet high, is well cultivated, with a large village on its northeast side. Northward of the village is the Morro of Taboga, a small hill connected with the main island by a sandy neck covered at high water.

This island is occupied by the Pacific Steam Navigation Company, which has here some stores, a water tank with abundant supply of water, and a gridiron 300 feet long.

The anchorage off the village is convenient, being about 600 yards from the shore, in 10 fathoms, with the peak of Urava in range with the high cliff of Taboga, and the church bearing between SW. and West.

Urava is a small lofty island separated from the southeast end of Taboga by a narrow and shoal channel; off its south extreme is the small islet of Terapa.

Taboguilla, 710 feet high, also well cultivated, with some islets off its southwest extreme, is the northeast island of the group, with a wide and deep channel between it and Urava, and in the middle of the channel a rock which uncovers 4 feet at low-water springs; the sea seldom breaks over the rock at high water, and it must be carefully avoided by closing either island, both being steep-to, or by keeping the neck of the Morro open, bearing N. 57° W. (N. 62° W. mag.), and passing south of it. Farallon, a small islet, also lies in this channel and is steep-to, with 10 fathoms between it and Taboguilla.

Melones, a small rocky islet, lies 2½ miles NW. of Taboga, with the Melones rock, above water, ½ mile to the northward of it.

Bruja point, about 5 miles northward of Taboga island, is a rocky projecting point, marking a turn of the coast. Venado, Cocovi, and Cocoviceta islets lie southwestward of the point, all within a distance of 1½ miles; and Tortola and Tortolita islets lie about 2 miles southeastward of the point and 3½ miles north of Taboga; these islets are all within the 3-fathom curve. From Bruja point to the city of Panama shoal water extends about 2 miles from the shore and envelopes all the islands on this side of Panama road.

Batele point, 1½ miles NE. of Bruja, is the south extreme, 102 feet high, of a large, round, hilly projection which forms the western side of Panama road. Changarmi island, surrounded by the Pulperia reefs with Penamarca rock at their northern end, lies 1½ miles S. 68° E. from the point.

Guinea point, 1½ miles northward of Batele point, is the north extreme, 320 feet high, of the hilly projection above mentioned. From here to the city of Panama, 2½ miles to the northeastward, the shore line recedes in an extensive bight, filled with mud flats, and is broken by the mouths of the Farfan, the San Juan, and the Grande, small rivers with cultivated banks. La Boca, at the mouth of the Rio Grande and about 1½ miles west of the city, is the railway terminus, where connection with ship is made.

Naos, Culebra, Perico, and Flamenco islands, with the outlying islet of San José, are a group in the southwestern part of Panama road, Perico, 335 feet high, lying about 6 miles northward of the north extreme of Taboguilla and 2 miles southward of the city. Naos, 167 feet high, is connected with Culebra and Perico by a neck of sand and rocks, covered at high water. The passage between Perico and Flamenco is shoal and should not be used except by boats, but that between Flamenco and San José has 5 fathoms in mid-channel and no dangers. Flamenco is 344 feet high.

Naos is the headquarters of the Pacific Mail Steamship Company, which has here machine shops, and a depot for fresh water, coal, and supplies, which articles can be obtained from the company. The bay on the northern side of Naos and Perico forms a convenient anchorage, and on the isthmus connecting the two islands, which is sandy on the north side, steam vessels of 2,500 tons have been easily beached. A channel has been cut by the tides around the eastern end of Naos island, through which the anchorage north of the island may be reached with a draft of 20 feet at mean low water.

La Boca channel has been dredged across the flats that fill the bight southward of the city, so as to connect the anchorage northward of Perico island with the Panama railroad terminus at La Boca, on the east side of the mouth of the Rio Grande, this being also the terminus of the Panama canal. A large iron pier for vessels has been constructed at La Boca, and in the basin adjoining it the depth at mean low water was stated by the Panama Railroad Company in June, 1901, to be nowhere less than 29 feet. The channel is well marked by ten pairs of buoys, and five additional buoys mark the west side of the basin opposite the pier. These buoys, while intended to be, respectively, red and black, show with the color of rusty iron. The railroad company possesses and maintains in readiness for use an extensive dredging plant for the purpose of keeping this channel deep enough for ocean steamers.

La Boca wharf* was built by the canal company, but has been turned over to the railroad company. During its construction its failure was predicted on account of the great rise and fall of the tide, and the difficulty of keeping open the channel leading to the wharf, as a great amount of mud is brought down by the San Juan river. The difficulties have been reduced to a minimum. Vessels are not lashed alongside the wharf, but have floats placed between them and the wharf, so that there are no bad results from

*Report of vice-consul general, June 15, 1901.

the tide. The cranes or winches on the wharf are of a special kind that permits the working of cargo at all stages of the tide.

The following measurements give, in feet, the size and capacity of the wharf: Total length, 985; total width, 54; depth of channel alongside at high tide, $45\frac{1}{2}$; at low tide, $26\frac{1}{4}$; width of channel alongside, 98; capacity of vessel space, 985; railroad tracks, 2; total length of railroad track, $787\frac{1}{2}$; car capacity of tracks, 39; cranes, 6 of 2 tons and 1 of 20 to 24 tons; tonnage of largest vessel yet docked, 4,600 tons.

The basin in which vessels lie has a maneuvering space of 486 feet. The bottom is soft mud, and while it is considered best for the vessels to be at all times afloat, yet they can rest easy in the muddy bottom.

From the above it is seen that any vessel of 500 feet length and not drawing more than 26 feet can be handled at this wharf with facility.

The wharf is constructed entirely of steel, and is roofed over and housed in with corrugated iron. The rates charged for vessels coming alongside are governed for the most part by contract.

Los Hermanos rocks are three black rocks, visible at first-quarter ebb, lying nearly $\frac{1}{2}$ mile south of the southeast bastion and 300 yards from the reef; detached rocks with 3 and 7 feet of water between them, visible only at low-water springs, lie off their southeast extreme, the outer one being 400 yards from the reef.

Buey point, seen only at half tide, is the northeastern extremity of the rocky ledge or reef that surrounds the eastern and southern shores of the peninsula occupied by the city, with a width of from 500 to 1,000 yards. Immediately south of Buey point, which lies 900 yards eastward of the northeast bastion, a deep indentation in the reef forms a bay in which, after half flood, there is easy landing on the sandy beach in front of the Monks' gate. The reef is marked by iron posts.

Petillo point, $1\frac{1}{2}$ miles northeastward of the city, is a black rocky promontory with two small hills over it, and between them a rivulet admitting boats at high water; rocky ledges extend 300 yards from the point. Between Petillo point and Buey point the shore recedes nearly $\frac{1}{2}$ mile, forming a bay called El Puerto, the head of which is of mud, edged with a sandy beach, and the greater portion dry at low-water springs. It is here that most of the minor trade of the gulf is carried on by means of bungos, large canoes made from trunks of trees, some of them though made of a single trunk measuring 12 tons; though clumsy in appearance they are well fitted for the navigation of the gulf, and bring to the city most of the tropical productions of the isthmus.

The Knocker and Taboga are two rocks with only 6 feet of water on them, the former nearly $\frac{1}{2}$ mile S. 86° E. (N. 89° E. mag.) from the southeast bastion, and Taboga about 300 yards southwestward of the Knocker; a stranger should not attempt to pass west of the red buoy marking the Knocker, this being in 14 feet about 300 yards eastward of the rock, which has near it depths of 8 to 12 feet. Shoal patches with 10 and 11 feet lie outside the buoy at from 400 to 800 yards from the Knocker.

Sulphur rocks.—This dangerous reef, lying about a mile northwest of the Danaide and $1\frac{1}{2}$ miles eastward of the southeast bastion, is about $\frac{1}{2}$ mile in extent, north and south, and has a rock awash in its center, with 6 and 9 feet around it, and outlying patches of 12 and 14 feet; the reef is marked by a red buoy on the southern side. The railroad flagstaff, in line with the center of mount Ancon, bearing N. 89° W. (S. 86° W. mag.), leads northward of the reef in 15 feet, but this passage should not be used at low-water springs.

Danaide rocks.—These four patches of conical rocks, lying on the eastern side of the Panama road, about $2\frac{1}{4}$ miles northeastward of Perico island and $2\frac{1}{2}$ miles southeastward of the city, have only 15 to 18 feet on them, with $3\frac{1}{2}$ and 4 fathoms on all sides. They lie awkwardly in the track of vessels standing for the anchorage from the eastward and keeping their luff with the land breeze. These shoal spots are favorite fishing places, and canoes seen in their vicinity should be avoided by vessels, as they may be fishing on the rocks.

Clearing marks.—The south steeple of the cathedral kept midway between the east and southeast bastions, N. 61° W. (N. 66° W. mag.), leads southward of all the Danaide patches; the Hermanos rocks in range with the hill, 252 feet high, between the rivers Farfan and Grande, S. 84° W. (S. 79° W. mag.), leads to the northward of the patches and southward of Sulphur rocks.

Panama road, the anchorage off the city of Panama, although shoal and on the seaward side entirely unprotected, may be considered secure. The bottom, being of mud, holds well, and with good ground tackle and common precaution a vessel might lie here with one anchor down all the year round. Attention to the tides and soundings will enable a vessel to lie close in at times for discharge of cargo. The new dredged channel leading to the railroad terminus at La Boca enables vessels to discharge and load at the pier.

The inner anchorage is in 2 fathoms about a mile eastward of the northeast bastion; the outer anchorage is in $3\frac{1}{2}$ to 4 fathoms about 2 miles southeastward of the city, or in 5 to 6 fathoms northeastward of Perico island.

Lights.—A fixed red light, visible 3 miles, is shown at the end of the railroad wharf, north of the city.

A fixed red electric light, maintained by the city to illuminate the promenade, is shown at an elevation of 64 feet above low-water mark from a pole standing 100 feet north of the corner of the southeast bastion, and is the highest electric light seen from the bay. This light is made on rounding Taboguilla, being then, in ordinary weather, distinctly visible, and is used as a leading light by the Pacific Mail steamers, giving them at night the direction of San José rock by shutting the light out behind the rock.

Tides.—High water in Panama road, corrected establishment, is at 3h. 2m.; low water at 9h. 12m.; mean range of tides, 13 feet; of springs, 17 feet; of neaps, 8 feet. The average times of high and low water are a trifle earlier at La Boca, and the range of the tide somewhat greater, the mean range of spring tides being 20 feet.

The datum plane for the *Ranger's* survey of the harbor of Panama in February and March, 1900, is mean low water as determined by the Panama Canal Company's observations, extending over a period of five years, at its tide-gauge station at the northeast end of Naos island.

Tidal streams.—The flood stream sets to the northwestward and the ebb stream to the southward, the strength varying from $\frac{1}{2}$ knot to $1\frac{1}{2}$ knots per hour, the ebb being stronger than the flood. The long swell which occasionally sets into the road ceases with the flowing tide.

Tidal streams in Panama harbor, as observed by the U. S. S. "Ranger" in February and March, 1900.

Station.	Half flood.			Half ebb.		
	Range of tide in feet.	Set.	Drift in knots per hour.	Range of tide in feet.	Set.	Drift in knots per hour.
Eastward of Perico and Flamenco islands.	21	NW. $\frac{1}{4}$ N.	0.6	20	SE. by S.	0.6
Knocker buoy ----	17	NW.	0.5	16	S. by E.	0.6
Entrance to La Boca channel.	17	W. by N.	0.4	21	S. by E.	0.7
Half way up La Boca channel.	17	WNW.	1.0	21	SE. by E. $\frac{1}{4}$ E.	2.2
La Boca basin, halfway between pier and inner-channel buoys.	17	W. by N.	1.0	20	SE. $\frac{1}{4}$ E.	1.5

Panama city, the capital of the Department of Panama, with a population estimated in 1901 at 20,000, of which the foreign element, mostly Jamaican negroes, forms about one-half, the Americans numbering about 100, stands on a rocky peninsula jutting out

into the shallow water at the head of the bay, and was formerly a strongly fortified city. It has a noble appearance from the sea; the churches, towers, and houses, showing above the line of the fortifications, stand out from the dark hills inland with an air of grandeur. About a mile westward of the city, to which it forms a pleasant background, is mount Ancon, a beautiful hill, 630 feet high; on each side of Ancon are flat hills with copses of wood and savannas, grassy slopes, and wild thickets, while to the southward the cultivated islets of Perico and Flamenco complete a scene which, says Dampier, makes "one of the finest objects that I ever did see, in America especially."

The expectations formed in viewing the city from the sea are by no means realized on landing. The principal streets extend across the peninsula and are intersected by the Calle Real, running east and west, which has a quiet and stately, but comfortless air. The houses are of stone, mostly in the old Spanish style, the larger ones with courts and patios; the public edifices, comprising cathedral, churches, convents, nunnery, college, theater, and market, are partly in ruins. The cathedral, a large lofty building on the west side of the plaza, is hardly worthy of its situation, only the towers redeeming it from insignificance and forming in the distance an ornament to the city. The fortifications were well constructed, but are in partial ruins, the northeast bastion having fallen in 1845; the south and west ramparts are in fair condition and form a pleasant promenade. Drainage is neglected, though the elevation of the peninsula on which the city stands, together with the great rise and fall of the tide, offers considerable advantages for cleansing, a duty at present performed by the heavy rains of the wet season. In 1901, the police force of the city, numbering 150, was reported as efficient, well uniformed, and well armed: the city was under martial law.

The old city of Panama, built in 1518, which was taken and destroyed by the buccaneers under Morgan in 1673, stood at the mouth of a creek, about 4 miles northeast of the present city. Old Panama was larger than the Panama of this day and a place of surprising wealth. The spot is now deserted, but well marked by a tower, an arch, two or three piers of a bridge, and some fragments of wall. In the afternoon the tower is still a conspicuous object from the anchorage.

Weather.—The following brief synopsis of the weather at Panama is by Mr. J. H. Smith, long a resident of the city:

January, February, and March.—Fresh north winds, fine weather, and clear sky.

April.—North winds decreasing, with frequent calms and light southerly airs in the day; latter end of month, occasional squalls from the north in the afternoon, with rain, thunder, and lightning.

May.—During the day, frequent calms and light southerly winds, weather becoming cloudy, and occasional fresh squalls from NE. to SE. with rain.

June.—The rainy season well set in, breezes during the day increasing from the south, with squalls and heavy rain; nights generally clear, with light land breezes from the north; latter end of month eight or ten days of fine weather frequently occur.

July, August, and September.—Moderate south winds, squalls, and rain; during the equinox four to six days of strong south winds, without cessation during the night, and frequent squalls, with rain.

October.—South winds, squalls, and rain; frequent land winds at night, and fine west winds.

November.—South winds decreasing, with frequent intervals of fine weather, and occasional squalls off the land.

December.—First part, frequent calms and light south winds during the day; latter part, occasional north winds and fine weather.

Fogs appear not to occur in the Gulf of Panama. During the rainy season the land is at times obscured or shut in by the heavy rains.

Sanitary conditions.—The habits of the people are in general most uncleanly and the sanitary condition is bad. Yellow fever, remittent, bilious, and pernicious fevers are endemic, and yellow fever was considered epidemic in July, 1885. No reliable information can be obtained as to the mortality of the port; it has been reported as high as forty per diem during the sickly season. The most sickly parts of the year are at the changes of the seasons; it is considered that the prevailing direction of the wind has some influence on the sanitary state, that the northwest winds are healthful and the southeast winds unhealthful; during the wet season calms and light variable winds prevail, the air is laden with moisture, and it is very oppressive. At the canal company's observatory on Naos island the highest temperature was 102° F. and the lowest 66° F.

Hospitals.—The foreign hospital, built and owned by the canal company, situated on high ground at the foot of mount Ancon, is well managed and clean, with a capacity of about 2,000; the cost of occupation is \$2, and \$5 per day for a separate room; two regular physicians are in attendance. A sanitarium on Taboga island is connected with the hospital.

The St. Thomas hospital, a charity institution, situated in the city and subsidized by the government, is dirty and not well kept; the capacity is about 100 and cost of occupation \$1 per day.

Supplies.—Supplies may be had, but it is considered unsafe to buy them on account of the bad sanitary condition of the place and the consequent danger of infection. Lighters for the trans-

portation of stores may be hired from the railway company. Fresh provisions in ample quantity and of fair quality can be purchased as required. Prices paid by the U. S. S. *Iowa* in October, 1901: Fresh beef, 12½ cents; vegetables, 8 cents; bread, 8 cents. All kinds of fruit are obtainable. Ice can be obtained in large quantities. Sand is obtained from Perico island. Good water can be obtained from the Pacific Mail Steamship Company at Flamenco island, or from the Pacific Steam Navigation Company at Taboga island, being brought alongside, and pumped into the tanks by steam pumps, at a cost of 2 cents per gallon. The *Iowa* was supplied by the Panama Railroad Company, by steam water boat, capacity 50,000 gallons, at 0.9 cent per gallon.

Coaling facilities.—Cumberland, Cardiff, Welsh, New Castle, and Australian coal can be obtained from the Panama Railroad Company, the Pacific Mail Steamship Company, and the Pacific Steam Navigation Company, which companies keep large quantities on hand, though it is said that the steamship companies will not part with any coal when it can be purchased elsewhere. The coal is delivered alongside in lighters holding from 150 to 250 tons, at a cost per ton of from \$13 to \$17. Coal may be obtained directly from the ship or collier, which greatly lessens the danger of fever. The *Iowa* was supplied by the Panama Railroad Company with 100 tons per week of Pocahontas coal at \$9.50, gold, per ton; supply reported as plentiful.

Telegraph and postal communication.—Panama is connected by cable with South American and Central American ports, and by land line with Colon, and thence by cable with Jamaica and the West Indies. The line to the United States and Europe is by way of the Tehuantepec isthmus, the city of Mexico and Galveston, Tex. Postal communication with the United States is by the Panama Railroad Company's steamers from Colon; with Central America, Mexico, and San Francisco, by the Pacific Mail and other steamers; and with South American ports by the steamers of the Pacific Steam Navigation Company and the South American Steamship Company. Mails from the United States are at times irregular.

Steamer lines.—Panama is a terminal point or port of call of four lines of steamers, viz:

(1) The Pacific Mail line to San Francisco, three times a month, calling at Central American and Mexican ports.

(2) The Panama Railroad Steamship line to San Francisco direct.

(3) The Pacific Steam Navigation Company's line from Coronel, Valparaiso and intermediate ports to San Francisco and intermediate ports; also line of this company from South American ports to Acapulco and way ports; and line from South American ports to Ocos and way ports.

(4) The Compañia Sud-Americana de Vapores line, with the same itinerary and alternating in service with the preceding company, Lota (Chile) being the extreme southern point, however, instead of Coronel.

The rate for first-class passengers from New York to San Francisco is \$105, and from New York to Valparaiso \$240.

Commerce.—The commerce and trade of Panama is naturally divided into two parts, the local and the transit; the latter is also divided into two parts, that with the United States and that with Europe. The entire local trade of Panama with the United States for the year 1885 amounted to \$3,728,961 of exports, and \$4,263,519 of imports.

The local exports are india rubber, which is becoming scarcer, gold dust, hides, ivory nuts, manganese, shells, tobacco, cocobolo (a cabinet wood), tortoise shells, vanilla, whale oil, sarsaparilla, cocoanuts, and fruit. From South America the bulk of the shipments consists of bark, cotton, cocoa, and rubber; from the Central American states, of coffee, sugar, and indigo.

Panama is nominally a free port, but import duties are levied on tobacco in all its forms, salted or preserved meats, wines, spirits, ales, beer, ginger beer, cider, salt, etc. Recent reports state that there is a customs duty of 15 per cent on all goods, with an increase on spirits.

In shipping stores for naval vessels on the coast to the care of the consul general at Panama, it is absolutely necessary that they should be accompanied by complete invoices stating the contents of each package, the weight thereof, and the cost value. Small parcels must also be accompanied by a statement of contents and value, addressed to the consul general or to the person to whose care they are consigned.

Machine shops.—The Pacific Mail Company has a small machine shop on Naos island for repairing vessels of the line, and the Pacific Steam Navigation Company has a similar one at Taboga island. There are no docks at Panama; the gridiron at Taboga is the only means of effecting repairs to vessels' hulls.

Landing place.—The general landing place at high water is around Buey point, inside the northeast bastion, at the market place known as "the steps." Great care is required when landing at Panama in steam cutters or other heavy boats, which can be effected only at nearly high water. Landing is made in small boats from ship's boats at Hotel Marina landing. Boats going in should pass southward of the outer white beacon, and leave all the other beacons on the port hand.

The Panama Railroad, 47 statute miles long, extending to Colon on the Atlantic side of the isthmus, is an asset of the bankrupt Panama Canal Company, which holds nearly all of the stock.

Culebra, the station at the highest point of the road, is probably, with the exception of the Nicaragua divide, the lowest point in the range of mountains that extends from North America all the way through South America, being 252.4 feet above mean sea level.

The road, which was built by an American company between 1850 and 1855, is a broad gauge, single-track line, with a maximum grade of 76.6 feet to the mile. The rate for first-class passengers between Panama and Colon, formerly \$25, is now \$4 in American gold.

At Colon, connection is made for ports of the Spanish Main, the West Indies, and all parts of Europe by steamers of the Royal Mail Steam Packet Company, Leyland Line, Harrison Line, Compagnie Generale Transatlantique, Hamburg-American Packet Company, La Veloce (Italian), and Compañia Trasatlantica Española. The steamers of the Panama Railroad Steamship line leave Colon for New York every Tuesday, time seven days.

The Panama ship canal, to connect the Atlantic and Pacific oceans, is planned to follow much the same route as that of the railway from Colon to Panama, the length to be 49.09 statute miles from the 6-fathom line in the harbor of Colon to the 8-fathom line in Panama road, and the depth 35 feet, with a minimum bottom width of 150 feet, as planned for the Nicaragua route. The special difficulties to be encountered are the deep cut of the summit level at Culebra, and the Bohio dam for the impounding and control of the waters of the Chagres river and its tributaries. The summit level of the canal, that of lake Bohio, this level being carried completely through the Culebra cut, will be nearly 22 miles in length and in general 85 feet above mean sea level, with extreme fluctuation between 82 and 92 feet; it will be reached by two locks on the Atlantic side, both at the Bohio dam, and by three locks on the Pacific side, two at Pedro Miguel and one at Miraflores, the latter point being 1.33 miles nearer Panama. The cost of construction to complete the canal on these lines, taking advantage of the work already done, is estimated by the Isthmian Canal Commission at about \$145,000,000.

The natural attractions of the Panama route lie in the combination of a very narrow isthmus with a low summit. The width of the isthmus in a straight line is 31 miles, while the summit is barely 300 feet above mean tide, which, though higher than the Nicaragua summit, is less than half the height of any other that has been investigated. The high portion of the isthmus is limited to a width of about 6 miles near the Pacific side, and the Chagres river affords access by canoe navigation to within 15 miles of the Pacific ocean.

Consuls.—The United States is represented at Panama by a consul general and a vice-consul general, Great Britain and France by consuls, and many other countries by honorary consular officers.

Port officials.—There is a captain of the port who is also the health officer, but it appears that he does not board incoming vessels and quarantine is not very strictly enforced.* The quarantine station is near Taboguilla island. Pilots are not required except for La Boca channel for which the pilot is furnished by the Panama Railroad Company.

Official calls.—The governor of the Department of Panama and the President of the Republic, when present, are the only native officials to be called on. A saluting battery has recently been established on shore and salutes are promptly returned.*

Directions.—Sailing vessels bound to Panama, especially between December and June, should endeavor to get within 3 or 4 miles of Chepillo island, which lies near the coast north of the Pearl islands, and so have all the advantage of the northerly wind. From this position Ancon hill, behind the city, will be seen and should be kept a little on the port bow, as the wind draws to the westward on approaching the city. Vessels drawing over 18 feet should pass south of the Danaide rocks by keeping San José rock open to the westward of Taboga island until the cathedral towers are open to the northward of Ancon. Having passed the Danaide the ship is fairly in the road and may anchor according to her draft; if not more than 18 feet she may have Tortola just shut in by Naos, bearing S. 30° W. (S. 25° W. mag.), and San José open east of Taboguilla. Larger vessels drawing 24 feet may anchor northeastward of Perico, with Urava peak in range with the east point of Flamenco bearing S. 6° W. (S. 1° W. mag.), taking care not to open Changarmi northward of Perico. If necessary to work up the road to an inshore berth, a vessel should tack on the western side just before Perico and Flamenco touch, and in standing to the eastward avoid closing San José with Taboga island, or Tortola with Flamenco.

Vessels drawing 14 feet may pass northward of Danaide and south of Sulphur rocks, with Hermanos rocks on with the right side of the peak between the rivers Farfan and Grande; then, San José rock on with the peak of Taboguilla, bearing south (S. 5° E. mag.), leads between Sulphur rocks and the Knocker to an anchorage north of the buoy, in 16 feet, keeping it between Perico and Flamenco, with Gabilan, a rocky peninsula west of the town, just shut in by the southeast bastion. During neap tides anchorage more to the northwest may be taken.

Coast.—From Petillo point to the Chepo river an extensive mud flat borders the coast the entire distance, fronted by a shoal bank the edge of which lies from 3 to 5 miles from shore. Numerous

* Report from U. S. S. *Iowa*, September 9, 1901.

small streams intersect the shore line. Vessels should not stand into less than 6 fathoms between Panama and Chepillo island.

Chepo river, which enters the bay of Panama about 25 miles eastward of the city, comes from some distance in the interior, its source being far to the eastward, near the head waters of the Savannah river. The entrance is to the westward of Chepillo island, through a 10-foot channel about 600 yards wide; a small hill with a cliff under it, on the eastern bank, steered for on a bearing N. 54° E. (N. 49° E. mag.), will lead through the deepest water.

The San Blas canal route, much recommended by the narrowness of the isthmus at this point, 27 miles, was carefully examined in 1870 by Commander Selfridge, U. S. N. The route ascends the Chepo river 12 miles, and then the Mamoni, a tributary from the northward, to its source; thence it crosses the divide, with an elevation of 1,142 feet, and descends by the Mandinga river to the gulf of San Blas. A tunnel of 10 miles would be required to connect cuts of 190 feet on either side of the divide; for the remaining 16 miles the excavation would not exceed an average of 60 feet. The vast expenditure for so long a tunnel renders this route, otherwise so prepossessing, of questionable practicability.

The most complete plan developed by the Isthmian Canal Commission for this route involves a tunnel at least 7 miles long, which, while considered not necessarily impracticable, would be very objectionable and renders this line inferior to that of Panama or Nicaragua.

Tides.—High water, full and change, at the mouth of Chepo river is at 3h. 40m.; tides rise about 16 feet.

Chepillo island, described by Dampier as the most pleasant island in Panama bay, lying off the mouth of Chepo river about 24 miles eastward of Panama and 2 miles from the coast, is 1 mile long by $\frac{1}{4}$ mile broad, and very fertile; it is low on the north side, and rises by a gentle ascent toward the south end, over which is a remarkable tree that forms an excellent mark to vessels bound up the bay. The south end may be approached within a mile, but the other sides are shoal, and a reef extends $\frac{1}{4}$ mile off the north point, following the direction of the channel.

Pelado islet, lying $31\frac{1}{4}$ miles southeastward of Chepillo island and 4 miles west of Mangue islet, directly off the mouth of Chiman river, is flat, of small extent, about 60 feet high, and treeless, but covered with a coarse prickly shrub; it is steep-to on all sides and forms a useful mark for vessels bound to Panama.

The coast between Chepillo island and Pelado islet consists of low river land with mangrove bushes. Of the several small streams, the principal are the Hondo and Corutu, both being shoal at the entrance. The land north of these rivers is of some elevation; Column peak and Asses ears, about 12 miles north of Chiman

river, and Thumb peak, at the west extreme of the range, are conspicuous. Extensive mud flats, dry at low water, extend from 1 to 4 miles from the coast, and outside of the flats is a shoal bank the outer edge of which lies 7 miles from the shore. Vessels standing in shore should tack in 9 fathoms.

Chiman river, 32 miles southeastward of Chepo river, is wide at the mouth, but shoal, being nearly dry at low water, with small channels for canoes. The entrance is well marked by the wooded bluffs on each side, the Mangue islet to the southward, and Pelado islet in the offing; on the eastern side, under a hill, is the small village of Chiman. This is the point to which Pizarro retired in 1525 after beating about for 70 days, with much danger and incessant fatigue, without being able to make any advance to the southward. He was here joined by Almagro, and the following year they sailed again for Peru.

Mangue and Majaguay are high and wooded islets lying, respectively, 3 miles and 2 miles south of the east entrance point of the Chiman river, and at the western edge of a large mud flat, dry at low water, which extends to the north bank of Trinidad river. There are 10 to 12 feet of water to the westward of the islets.

Trinidad river, about 9 miles southeastward of Chiman river, has a low rocky projection forming its southern point of entrance. A 3-fathom channel was found into this river, extending $1\frac{1}{2}$ miles from the point, beyond which distance it was not examined. The northern bank of the river is composed of mangroves, which continue along the coast from here to Panama, a distance of nearly 70 miles, except where interrupted by the bluffs of the rivers Chiman and Chepo. Shag rock, a barren islet with shoal water around it, frequented by birds, lies $2\frac{1}{2}$ miles northward of the entrance.

The Pajaros are two small rocky islets, lying between 2 and 3 miles south of the south entrance point of Trinidad river and $1\frac{1}{2}$ miles from the coast, with 4 and 5 fathoms off their west sides, but only 12 feet between them and the shore. From Chamé point, SW. of Panama, to these islets, the whole shore of Panama bay is fronted by a shoal with 5 fathoms on its outer edge.

South Farallon Ingles is a small but high island, lying about 8 miles southward of the Pajaros and 19 miles southeastward of Pelado islet, at the edge of the shoal off the river Buenaventura, with 12 and 15 feet of water on its western side. North Farallon lies $\frac{3}{4}$ mile to the northward and $\frac{3}{4}$ mile from the west entrance point to the river. It was in this river, in 1681, that Dampier and his party, being prevented by the Spaniards from going by way of the Santa Maria or Chepo rivers, sank their ship when starting on their journey to the Atlantic; this they reached in 23 days at a

point near Concepcion cays, 60 miles westward of Golden island in Caledonia bay, having traveled 110 miles and crossed some high mountains, though their common march was in the valleys among deep and dangerous rivers.

Gorda point, 4 miles northward of the South Farallon, is bold and woody, with 4 fathoms close-to; above this point there is less swell than to the southward of it.

Brava point and San Lorenzo point, 2 miles to the eastward of Brava, lie on the north side of the entrance to San Miguel bay; both are edged with reefs and outlying rocks, on which the sea breaks with great violence, and this fact, together with the proximity of the Buey bank, makes this part of the coast dangerous, and it should be avoided even by small vessels.

Buey bank, lying about a mile south of Brava point, in the northern part of the entrance to San Miguel bay, is an extensive shoal about 3 miles in diameter, which dries in patches at low water and on which a heavy sea breaks. A passage $\frac{5}{8}$ mile wide, with 4 to 5 fathoms, lies between the bank and the shore, but subject to a heavy swell and not recommended for use. A spit with 12 feet of water extends $1\frac{1}{2}$ miles off the southwest side of the bank, and outside the spit the water deepens very gradually, the 5-fathom line lying about 3 miles to the westward and 2 miles to the southward.

San Miguel bay, on the eastern side of the gulf of Panama, is $15\frac{1}{2}$ miles wide between the entrance points, Brava on the north and Garachiné on the south, and penetrates within the points about 20 miles to the eastward. Between San Lorenzo point and Patena point to the southeastward, the bay narrows to about $7\frac{1}{2}$ miles, expands again within to 11 miles, and again narrows to $4\frac{1}{2}$ miles between Pierce and Virgin points; thence continues a curved and gradually narrowing channel, terminating in the land-locked and spacious Darien harbor, formed by the junction of the rivers Savannah and Tuyra.

Across the entrance of the bay and for about 9 miles seaward extends a flat bottom with depths from 5 to 8 fathoms, but the water gradually deepens within the bay, and through the Boca Grande the depths are from 11 to 16 fathoms. Across the entrance flat a depth of $7\frac{1}{2}$ fathoms can be carried, and thence to Darien harbor more than 8 fathoms.

San Miguel bay was well known to the buccaneers, who used it as the entrance to the Pacific and terminus of their overland journeys from the gulf of Darien, which they generally accomplished in about 10 days. Careful surveys were made in 1870 and 1871 by naval parties under Commander Selfridge, U. S. N., to ascertain the feasibility of a ship canal between this point and the Atlantic

coast at Caledonia bay and the gulf of Darien, but the different routes across this part of the isthmus were found to be quite impracticable. The route by way of the Atrato, the Napipi, and the Doguado rivers, considered by Commander Selfridge as the most practicable route eastward of Panama, terminates on the Pacific at Chiri-Chiri bay, 112 miles below Garachiné point.

San Lorenzo point lies 2 miles S. 76° E. from Brava point, the shore between them receding in a shoal-water bight. A reef projects about 2 miles southeastward from the point, and on the reef at $1\frac{1}{4}$ miles from the point are the Paul rocks, above water.

From San Lorenzo point the shore line turns sharply northward and sweeps around in a semicircular curve to Pierce point, a rocky projection 7 miles to the northeastward, forming within these points North bay, in which the depths are quite regular from $2\frac{1}{4}$ to 2 fathoms. A mud flat borders most of the shore, and several streams enter the bay, among them being the rivers Congo and Cupunadi. In the western part of the bay is a shoal bank of triangular shape, about 3 miles on a side, with depths of $\frac{1}{2}$ fathom, and on this bank are the islands Iguana and Iguanita and the Amelia islets and rocks. Lost rock lies 2 miles north of San Lorenzo point and $\frac{1}{4}$ mile from shore.

From Pierce point a reef projects about $\frac{3}{4}$ mile to the southward, with a rock above water near its outer end. McKinnon bay, a small bight with shoal water at the head, lies eastward of the point and reef. Péris point, 4 miles northeastward of Pierce point, marks a sharp turn of the shore line to the northward at the beginning of the Boca Grande.

Garachiné point, the south entrance point of San Miguel bay, is at the extremity of a peninsula projecting $5\frac{1}{2}$ miles northward from the mainland, with an average breadth of 2 miles. The land to the southward and eastward of the peninsula is lofty, mount Zapo, noticeable as a sharp conical peak about 5 miles from the coast, rising to an elevation of 3,000 feet above the sea. A high, bold, and wooded coast, apparently free from dangers and with deep water close-to, extends southward about 30 miles to Piñas bay. Cape Escarpado, with a small bight just above it, open to the northwestward, lies about 3 miles southward of the point.

Garachiné point is clean, and on its north and west sides may be closely skirted; but on the east side the line of 3 fathoms runs eastward from the extreme point.

Garachiné or South bay, lying within Garachiné point and Patena point, $11\frac{1}{4}$ miles to the northeastward, is shoal, with a low mangrove shore from which mud banks extend to a distance of 3 miles; these flats are fronted by a shoal bank with 2 to 3 fathoms, occupying much of the remaining area of the bay. Several small

streams enter the bay, and a channel with $\frac{1}{2}$ fathom of water leads across the mud flat to the mouth of the river Sambu. Along the east side of the Garachiné peninsula extends a tongue of water with a depth of $2\frac{1}{2}$ fathoms, forming a small harbor with anchorage for small vessels near Garachiné village, a small collection of huts at the head, where enters the river Alquitran.

Vessels may anchor close-off either Garachiné or Patena points, the depth of water being convenient.

Patena point is low, sharp, and projecting, with Patenito islet close outside and deep water near islet and point. **Colorada point**, about $2\frac{1}{2}$ miles northeastward of Patena, is bold and rocky, with a conspicuous patch of reddish clay on its face; within the points the shore recedes about $1\frac{1}{2}$ miles forming Charles bay. From Colorado to Corales point, $1\frac{1}{2}$ miles to the northeastward, the shore gradually gets lower, and from the latter point sweeps around to Virgin point, forming a bay with low mangrove shores, nearly 5 miles wide between the points; at the head is Corales village, about a mile southeast of the point, with anchorage off it at $\frac{1}{2}$ mile; the shore of the bay is bordered by shoal water to the distance of $\frac{3}{4}$ to $\frac{1}{2}$ mile, outside of which are apparently no dangers.

From **Virgin point** the shore line in its general trend turns gradually northward for nearly 5 miles to Virago point, at the entrance of the Boca Chica; in this space are several little bays lined with mangrove, the points generally being of small elevation, rocky, and covered with bush. **Bains bluff**, 1 mile southward of Virago point, should be avoided on account of a ledge of rocks off it at 600 yards; the shore between the bluff and the point is also bordered by shoal water.

Cedar or Washington island, $3\frac{1}{2}$ miles NE. of Corales point and $1\frac{1}{2}$ miles west of Virgin point, is about 600 yards long and wide, and densely covered with wood; several islets and rocks extend southward from it, and these, with the shoal extending from the opposite shore, take up much of the width of the channel on this side of the island. The best and most direct channel up the bay is northward of the island, and between it and Jones islet, a conspicuous little rock about 20 feet high and covered with grass, lying $1\frac{1}{2}$ miles to the northwestward of Cedar, both being clean and safe of approach, with 10 fathoms in mid-channel.

Strain island, $2\frac{1}{2}$ miles northeastward of Cedar and $1\frac{1}{2}$ miles from the eastern shore, is about 25 feet high and covered with trees and shrubs; it is surrounded by a ledge of rocks, extending a short distance off it toward the channel, and is connected by mud banks with two islands westward of it.

Between Strain island and the western shore are Jorey island, a chain of islets called Los Gombales, Edith islet, and Mary islet,

all forming a group within the 5-fathom line, covering an area of 2 miles by $1\frac{1}{4}$ miles; Strain is the southeasternmost of the group, and nearest the channel.

Anchorage.—The space included between Cedar, Jones, and this group of islets appears to afford the most favorable anchorage for vessels not wishing to enter Darien harbor, or obliged to wait for the tide in order to do so on account of the strong tidal currents and eddies in the entrances.

Barry rock, $\frac{7}{8}$ mile southwest of Strain island and $\frac{3}{8}$ mile north of Seaford point, is 20 feet high, covered with cactuses, and surrounded by deep water; the channel is between the rock and the island, and has a depth of 10 fathoms.

Stanley island, low and wooded, $1\frac{1}{2}$ miles long by 1 mile wide, divides the channel into two passages, both leading into Darien harbor; the principal one, the Boca Grande, forms a continuation of San Miguel bay to the northward along the west and north sides of the island, while the Boca Chica skirts its south side, lying between the island and Virago point.

The Boca Chica has on either side of its outer entrance a dangerous ledge of rocks, the passage between them being but about 200 yards wide; the southern ledge, called Columbia rocks, projects about $\frac{1}{8}$ mile westward from Virago point and shows only at low-water spring tides; the Foley rocks lie along the north side of the channel, extending nearly $\frac{1}{4}$ mile westward from the south point of the island, and uncovering at half tide; north of this ledge is Trevan islet. At $\frac{3}{8}$ mile within the entrance the channel narrows to about 50 yards, the width between the shores being less than 200 yards. A small ledge makes out a short distance from Buena Vista, the southeast point of Stanley island, having passed which the vessel will be in Darien harbor, and may anchor, as convenient, in 5 to 10 fathoms, sand and mud.

Although the Boca Chica carries a low-water depth of 5 fathoms its use is not recommended, unless at slack water, for during the strength of the tide the velocity of the stream reaches 6 to 7 knots, and the eddies make steerage difficult.

Leading mark.—The northwest extreme of Jorey island and the middle of Mary islet in line, S. 58° W. (S. 53° W. mag.), clears the rocks in the entrance of the Boca Chica; when past these rocks a vessel should keep in mid-channel, and when past the reef off Buena Vista point haul a little to the northward, to give Price point a berth of 150 yards.

The Boca Grande is a little over a mile wide at the entrance, between the rocks outside the Boca Chica and Milne island, on the western shore, and continues for $1\frac{1}{2}$ miles at about the same width between Stanley island and the shore. A dangerous rock, only

showing at about three-quarters ebb and connected by a ledge with the island, lies off its northwest point, and from the opposite shore a shoal extends $\frac{3}{4}$ mile, leaving between rock and shoal a width of $\frac{3}{4}$ mile for the navigable channel; this now bends to the eastward and continues of the same width between Ray and Jeannette islands, on the north, and a large flat rock, nearly always uncovered, and a small wooded island, about a cable off Stanley, on the south; then bending southeastward it continues between Ellen and Paley islands on the west and the main shore on the east into Darien harbor, gradually broadening after passing the former island and attaining a width of nearly 2 miles abreast of the Boca Chica.

Savannah point is the southern extremity of the long, low peninsula separating for a distance of 5 miles the Savannah river from the Boca Grande. Foul ground borders the point, extending off $\frac{1}{4}$ mile, and at that distance south of the point is a small islet with deep water close along its southern edge. Graham point, $\frac{1}{4}$ mile beyond Savannah, marks the entrance of the river, and has close off it the tiny islet La Pantila.

Vaguila rock, showing at about half tide, lies a little over $\frac{1}{4}$ mile south of Savannah point. There is a good channel, $\frac{3}{4}$ mile wide, between the rock and the islet off the point, with 9 to 11 fathoms of water.

Directions.—To pass through the Boca Grande: After passing Barry rock a vessel may haul up for the southwest end of Stanley island, keeping on the range of Barry rock and Virgin point until Jones islet comes in range with Strain island; then steer to pass about $\frac{1}{4}$ mile from Milne island, and as soon as Mary island is shut in by Milne, steer for Ray island, keeping the east end of Edith island a little open of Milne; following the channel, pass Ray at $\frac{1}{4}$ mile, and as soon as Ellen island opens from Turk island haul to the southward, giving these islands and then Paley island a berth of $\frac{1}{4}$ mile to starboard, and anchor, as convenient, in 5 to 10 fathoms; bottom, sand and mud.

Darien harbor, formed by the junction of the Tuyra and Savannah rivers, extends in a southeasterly direction from the Boca Grande to the village of Chipigana on the south bank of the Tuyra, a distance of 11 miles, with a width of 4 miles in the northern part and 2 miles at the village. The depth of water is from 7 to 10 fathoms from Paley island to the mouth of the Savannah, beyond which it shoals rapidly, almost the entire harbor having a uniform depth of from 13 to 17 feet. Off Chipigana there is a depth of $3\frac{1}{2}$ fathoms for an area of about 1 mile by $1\frac{1}{2}$ miles, affording excellent anchorage for vessels not exceeding that draft, to which it is accessible by taking advantage of the tides. During

spring tides, which here rise 22 feet, the currents both of ebb and flood run at this point with great velocity, and especially is this the case during freshets, when it is oftentimes difficult for a vessel to remain at anchor.

The shores of the harbor are almost a continuous line of mangrove, intersected by numerous small streams, with densely wooded hills from 100 to 300 feet high a short distance inland. Chipigana is a town of about 600 inhabitants, mostly negroes, of which race almost the whole population of Darien is composed. The houses are built of bamboo, and everything is of the most primitive description, a compromise between barbarism and civilization.

La Palma village, on the west shore, just at the inner entrance to the Boca Grande and at the beginning of the shoal water of the harbor, appears to be situated at the best point, and has an abundance of fresh water.

Anchorage.—The best place for anchorage is in 7 to 10 fathoms off Palma village, about a mile southeastward of Price point and 600 yards from shore.

Tides.—High water, full and change, in Darien harbor is at 4h. 15m.; the mean rise and fall of tide is 16 feet. The tidal streams in the narrows are very strong, especially at the time of springs, which are said to rise 24 feet. Great care is required in the navigation, and it would seem advisable, at least for a stranger, to wait for slack water before attempting the passages.

Productions.—All tropical productions of the western hemisphere can be grown here; maize, rice, sugar, coffee, cocoa, yams, and plantains grow almost wild; mahogany can be had in abundance; also the palm and the india-rubber tree abound. This fine harbor, with its extensive rivers penetrating into the interior, in the hands of an energetic people that would cultivate the fertile soil of the region, would soon become a place of importance.

Climate.—There is a rainy and a dry season, the former beginning in May and lasting until November, accompanied by lightning and thunder, and winds peculiar to the gulf of Panama; for the other six months of the year the weather is fine. With common care, the country is comparatively healthy.

Tuyra river, the Santa Maria of the Spaniards and buccaneers, rises in latitude 7° 40' N. and enters Darien harbor near the village of Chipigana. About 26 miles above this village and a mile above the junction of the river Chucunaqua are the ruins of the old Spanish fort of Santa Maria, near which were the gold mines worked by the Spaniards in the seventeenth century. As far as Santa Maria, which is the head of navigation for all craft but canoes, the depths in the river are from 1 to 5 fathoms; above this

point a steam launch drawing $3\frac{1}{2}$ feet could go only during spring tides.

The spring tides extend during the dry season to some 3 miles above Pinogana, which is 48 miles by river above Chipigana, but at this point the flood does not run more than two hours, with an extreme rise of 4 feet. During the neap tides the rise barely reaches Pinogana, and during the rainy season the influence of the tide extends but half the distance, owing to the great amount of water to be backed up.

By following the bends a depth of 30 feet can be carried 20 miles above Chipigana, except at the crossings, where there is but 22 feet at ordinary high tide; above this point the channel of the Tuyra narrows considerably and the depth decreases. The country as far up as Pinogana is flat and marshy a long distance back from the river, and is overflowed during high water in the autumn.

The canal route by way of the Tuyra ascends this river some 40 miles above Pinogana, and then the Cué, a tributary from the eastward, to its source; thence it crosses the divide at an altitude of 753 feet above the sea, and descends the Cacarica or the Peranchita to a junction with the Atrato, and then this magnificent, deep, and navigable river, some 40 miles, to the gulf of Darien. The difficulties of this canal line of 55 miles, with its necessary tunnel of 2 miles, are such as to make it quite impracticable.

Chucunaqua river, which joins the Tuyra from the north at a point 25 miles above Chipigana village, rises in latitude $8^{\circ} 50' N.$, westward of Caledonia bay on the Atlantic; its course appears to have been the favorite track of the buccaneers from the Atlantic to the Pacific. Captains Coxon, Harris, and Sharp, with 330 men, in April, 1806, started from Golden island in Caledonia bay and on the second day reached the head of this river, which they describe as so serpentine that they had to cross it every half mile, sometimes up to their knees, sometimes up to their middle, and as running with a very swift current. On the fifth day 70 of the men embarked in canoes, but found that mode of traveling quite as wearisome as marching, for at almost every furlong they were constrained to quit their boats to launch them over rocks, or over trees that had fallen athwart the river, and sometimes over necks of land. Early on the eighth day they reached Yavisa, which is 15 miles from Santa María, at the junction of the river of the same name, now the residence of the principal authorities of the province; here they halted to prepare for the attack on the fort. They also made paddles and oars to row with, for thus far down the river the canoes had been carried by the stream and guided by poles, but here the river was broad and deep. On the morning of the tenth day they attacked and carried the fort, but without

gaining the expected amount of plunder, although a buccaneer says, "we examined our prisoners severely."

Savannah river rises in latitude $8^{\circ} 44'$ N. and a few miles from its source meets the river Loro, where the bottom is level with the half tide. Below this point for about 10 miles there is a general depth of $1\frac{1}{2}$ fathoms, except in two places, where banks with only $\frac{1}{2}$ fathom extend from shore to shore; thence to the mouth of the river, a distance of 12 miles, there is a good navigable channel with a least depth of $3\frac{1}{4}$ fathoms, except for a stretch of $1\frac{1}{4}$ miles with $2\frac{1}{4}$ fathoms, just above the junction of the Rio Ingles. The navigable entrance is about $\frac{3}{4}$ mile wide between Graham point and Haydon bank, the channel narrowing within to about $\frac{1}{8}$ mile. The shores of the river are low mangrove land, skirted with hills 200 to 300 feet high, within 2 miles of the banks. H. M. S. *Virago* anchored in $3\frac{1}{4}$ fathoms, 1 mile northeast of Graham point.

The Darien Canal route, so called, as surveyed by Commander Selfridge, U. S. N., in 1870 and 1871, ascends the Savannah river 24 miles to the junction of the Loro, and then the latter to its source; thence it crosses a ridge and descends the La Paz to the Chucunaqua, crosses the latter and ascends to its source, the Sucubdi, a tributary from the east; thence it crosses the divide at about 4 miles from the Atlantic coast, with an elevation of 1,003 or 1,259 feet, and descends to Caledonia bay by either the river Aglaseniqua or the Caledon.

A variation of this route, starting from the junction of the La Paz with the Chucunaqua, ascends the latter some miles to the Morti, and this river to the divide, with here an elevation of 1,137 feet, descending thence to Caledonia bay by the river Sasardi.

A canal by way of the Sucubdi would require a tunnel 10 miles long to connect the elevation of 160 feet on the Atlantic slope with a corresponding height on the Pacific slope; in addition there would be an average cutting of 130 feet for 10 miles or more, and the Chucunaqua to be crossed by a costly aqueduct. The route by way of the Sasardi and Morti presents results of the same character and no less unfavorable. The impracticability of the Darien route was considered by Commander Selfridge as fully established.

By the report of the Isthmian Canal Commission the Sasardi route would require a tunnel 1.6 miles long, assuming an open cut to be used to a depth of 400 feet; and if the Aglaseniqua or the Caledon were used the tunnel would be about 2 miles longer, while the approaches on the south side would be much heavier. The total length of canal navigation from Caledonia bay to the mouth of the Savannah river would be about 50 statute miles.

San José bank, a dangerous shoal in the center of which is the Trollope rock with only 2 feet of water on it, lies in the fairway

of vessels bound to Panama from the southward, the rock being 15 miles N. 88° W. from Garachiné point, and 10 miles S. 62° E. of Galera island, the southeasternmost of the Pearl islands. The bank is 1 mile in diameter within the 5-fathom line, and $2\frac{3}{4}$ miles long by 2 miles wide within the 10-fathom line, outside of which the water deepens in general quickly; close to the rock are $2\frac{3}{4}$, $3\frac{1}{4}$, and 4 fathoms. Vessels should not approach within the depth of 10 fathoms.

Marks.—The Trollope rock may be easily avoided, either by keeping along the main shore until past Garachiné point, or by passing about 2 miles from Galera island, with care for the shoal patch and rocks off its southern side.

THE PEARL ISLANDS.

The Pearl islands, also known as Islas del Rey, Islas des Istmo, and Islas de Colombia, form an archipelago consisting of sixteen islands and numerous rocks, covering an area of 450 square miles on the eastern side of Panama gulf, the northern extremity being 33 miles southeastward of Panama city and 15 miles from the nearest part of the mainland. Rey island is the largest of the group; San José, Pedro Gonzales, Bayoneta, Casaya, Saboga, Pacheca, and Contadora are of secondary, and the rest of minor importance. Scattered among these islands are numerous fishing villages, containing 1,941 inhabitants in 1843, chiefly engaged in the pearl fishery, which formerly produced about 2 gallons of pearls a year. The pearl shells gathered here, also an article of commerce, are known as Panama or Bullock shells, and are shipped to San Francisco or Panama in barrels.

These islands are low and wooded, the soil is fertile but not much cultivated, the numerous cocoanut groves and bright sandy beaches, interspersed with small rocky bluffs crowned with trees, give them a pleasing appearance.

Saboga anchorage.—This good and spacious harbor, about 2 miles long, north and south, and nearly 1 mile wide, with an average depth of 9 fathoms, lying at the extreme northern end of the archipelago, is formed by three islands and numerous islets and shoals. Saboga, the largest island, $1\frac{3}{4}$ miles long by an average width of $\frac{1}{2}$ mile, is on the southwestern side; from its northern end a reef and shoal extend $1\frac{1}{4}$ miles to the northward, protecting the harbor on the west; Contadora island, $1\frac{1}{2}$ miles long and $\frac{1}{2}$ mile wide, forms the southeastern side; and Pacheca island, $\frac{3}{4}$ mile long and $\frac{1}{2}$ mile wide, the northern side; about midway between these two islands is Bartholomew islet, north and south from which extend shoals, protecting the harbor on the east side.

Channels.—Three channels lead into the harbor, respectively from the northwest, the east, and the south. The Pacheca channel,

southward of this island, is nearly $\frac{1}{2}$ mile wide and appears to carry a depth of not less than $5\frac{1}{4}$ fathoms in a straight course, but should be more closely examined, as there is a deficiency of soundings. Bartholomew islet on a bearing S. 66° E. (S. 71° E. mag.) leads through in about mid-channel. Contadora, northward of the island, is at present the deepest and safest channel, carrying a least depth of 9 fathoms by keeping the north end of Saboga just open of the south end of Near islet, S. 85° W. (S. 80° W. mag.). Saboga channel, between this and Contadora, appears to have a 5-fathom channel, but must be navigated with caution, and is not recommended before further examination on account of the shoals obstructing the entrance, and reported shoal patches outside. If this harbor were to be much used a few buoys would greatly assist the navigation.

A considerable village with a church lies on the northeast shore of Saboga island, at the head of a bay filled with a shoal and a reef; the usual anchorage is in 7 or 8 fathoms at $\frac{1}{2}$ mile off this village. Contadora has 5 fathoms close along its northwest shore, which is low and well adapted for wharves.

Tides.—High water, full and change, at Saboga anchorage is at 4h. 0m.; springs rise about 14 feet.

Chapera and Pajaros, the next islands to the southward of Contadora, have a 4-fathom channel between them, but it should not be used as the ground is foul; a $2\frac{1}{4}$ -fathom shoal lies $\frac{3}{4}$ mile eastward of Pajaros, and southward of this island the soundings are very irregular, with rocky bottom. No vessel should attempt the passages between Pajaros and Rey islands without previous examination and marking the points of the shoals.

Casaya, Bayoneta, and Viveros are the largest of a cluster of islands on what may be termed an extensive reef, about 8 miles long by 5 miles broad, stretching off the northwest point of Rey island; there are also numerous islets and rocks rising from the reef, and the passages between them all are foul, with occasional strong tides. A bank $1\frac{1}{2}$ miles long by $\frac{3}{4}$ mile wide, with only 9 feet of water on its shoalest part, lies nearly 4 miles eastward of the north point of Casaya; and the Caracoles and Cangrejo islets, with foul ground around them, lie about 2 miles off the northeast point of Viveros.

Clearing marks.—The entire group of islands stretching northwestward from the northwest point of Rey island should be avoided by Panama bound vessels, which should not approach the islands on their western side nearer than just to open the eastern point of San José eastward of Pedro Gonzales island, bearing S. 6° E. (S. 11° E. mag.); and on their eastern side should not open San Pablo, an islet off the northeast side of Rey island, or bring it to bear eastward of S. 31° E. (S. 36° E. mag.).

Rey island, the largest of the Pearl group, is about 15 miles long, north and south, by 7 miles wide, with several peaks, the highest being 600 feet high. Numerous islets and shoal patches, with deep water between them, lie 3 miles off the western shore, but should not be approached by strangers within the depth of 10 fathoms. Cocos point, the south extreme, is the end of a remarkable promontory, 4 miles long by about 1 mile wide, jutting southward into the sea; its extreme cliff was crowned in 1859 by an umbrella-like tree, making it conspicuous.

Off the eastern shore of Rey are also islands, but they are steep-to and may be approached within $\frac{1}{2}$ mile, with the exception of Cañas island off which is a 3-fathom patch lying outside a sunken rock, nearly $1\frac{1}{2}$ miles from the shore; this may be easily avoided by not opening Monge islet eastward of St. Elmo island until Pablo islet opens eastward of Muerta, a small barren islet lying about 1 mile northward of this patch.

St. Elmo bay, on the east side of Cocos point, is open to the southeastward, but has convenient anchorage in all parts, in 6 to 9 fathoms, and a good stream of water near Lemon point at its head.

San Miguel, the principal town of these islands, is on the north side of Rey; it is of considerable size, with a conspicuous church, but is badly situated, landing at low water being difficult. Cerro Congo and Cerro Vali rise southward of the town, the former being 481 feet high. Supplies are uncertain and dear, all productions of the island being generally sent to Panama.

Anchorage.—Vessels having to lie off the town should run in between Caracoles and Cangrejo islets, taking care not to shoal the water under 7 fathoms at low water and using caution in the approach, as the bottom is irregular and rocks abound; anchor in about 6 or 7 fathoms when the church is shut in, or behind Afuera, an islet lying off the town, bearing S. 29° E. (S. 34° E. mag.).

Galera island, lying 8 miles S. 81° E. from Cocos point, is small, and, like the point, remarkable for its umbrella tree. A cliff forms its southern side, sloping down to a beach on the north, and to the southward a reef runs off for nearly 1 mile. This island is generally the first land made by vessels bound to Panama; it should not be approached within the depth of 10 fathoms, but between it and Cocos point there is a good passage by using which the vessel will be clear of the San José bank, 10 miles to the southeastward.

Pedro Gonzales island, separated from the islets off the west side of Rey by a broad deep channel, is of irregular shape, with an extreme length, NW. and SE., of $3\frac{1}{2}$ miles by an average width

of $\frac{1}{2}$ mile, and has on its northern side a wide and deep indentation forming two bays, Perry and Magicienne, partially protected on the north by the small islands Señora and Señorita. Trapiche island, 100 feet high, which is connected by a sandy neck with Gonzales at low-water springs, forms the division between the two bays; off the east point of Trapiche extends a rocky ledge, and from this extends a shoal with 14 feet of water at the end, nearly 600 yards from the point. Perry bay, which lies within this shoal and Swift point on the opposite side, is a mile wide and penetrates nearly a mile, affording anchorage in 5 to 7 fathoms, with good protection from wind and sea.

A large stream of water, found in full force in the month of April at the end of what had been considered a remarkably dry season, runs into the sea on the western side of Magicienne bay; this bay, however, is small and shoal, having only a tongue of deep water, $3\frac{1}{4}$ fathoms, projecting $\frac{3}{8}$ mile within the entrance, with a width of $\frac{1}{8}$ mile. Señora, wooded and 70 feet high, and Señorita, small and 40 feet high, with the shoals off their eastern sides, have an extent of about 1 mile, and are separated from Trapiche by a 7-fathom channel, steep-to on both sides.

Perry and Magicienne bays were examined in 1858 as to their capabilities for a depot for steam vessels; although not considered so good and not so near Panama as Saboga anchorage, they were thought to have some advantages.

Tides.—High water, full and change, in Perry bay is at 3h. 50m.; rise 16 feet. The tidal streams are not felt at the anchorage, but off the island there is a considerable set, the flood running northward and the ebb southward, the latter being generally the stronger.

Directions.—Vessels may pass on either side of Señora and Señorita islands, taking care to avoid the shoal eastward of them, if passing on that side, by keeping the eastern point of Gonzales island, a rocky peninsula, open of the point next north of it, bearing S. 17° E. (S. 22° E. mag.), until Punta Piloto, 120 feet high, the north extreme of Gonzales, bears to the westward of S. 73° W. (S. 68° W. mag.); if entering Perry bay, the shoal off Trapiche may be avoided by not passing westward of midway between this island and Swift point.

San José island, lying 4 miles south of Gonzales, is about $6\frac{1}{2}$ miles long by 3 miles wide, and its summit forms a table-land said to be a considerable grazing ground. Nearly 2 miles southeast from Iguana point, the north extreme of the island, a large waterfall, running into the sea, affords an excellent watering place. A deep bay indents the southeast side of the island, but the swell sets in there with great violence. Off the southern end are a

number of high rocks of singular and fantastic shapes, also lashed by a heavy surf; this part of the island should be avoided. The western shore is bold and cliffy, with a small bay near the middle, opening to the northwestward.

The channel, $6\frac{1}{2}$ miles wide, between Rey and San José, is foul on the Rey side, but deep and clear on the San José side, the depths exceeding 20 fathoms for two-thirds the length of the island.

Passage rock.—This dangerous sunken rock, with 12 and 9 fathoms close around it, lies near the middle of the channel, otherwise deep and clear, between San José and Gonzales islands.

Clearing marks.—The peak next south of the highest on Rey island, just open south of Coco islet, one of the outlying islets off the west side of Rey, bearing N. 78° E. (N. 73° E. mag.), leads more than $\frac{1}{2}$ mile southward of Passage rock; vessels should keep between this line and the San José shore.

Bound to Panama.—Vessels bound to Panama from the northward should make the island of Jicaron, which lies about 50 miles westward of Mariato point, and from here endeavor to keep under the land as far as cape Mala, or, if unable to do this, push across for the opposite coast, where the current will be in their favor. On getting to the eastward of cape Mala, the safest plan is to shape a course for Galera island and use the eastern passage, that between the Pearl islands and the main; if, however, tempted up the gulf by a fair wind, vessels should endeavor to get on the western coast of the Pearl islands, for the reasons noted below.

The passage from the southward into the gulf of Panama is easily made during the greater part of the year by keeping about 60 miles from the coast north of Guayaquil, and after crossing the line shaping a course for Galera island, taking care, especially in the dry season, to stand inshore with the first northerly wind; by so doing, vessels will most probably have the current in their favor along the coast, whereas by keeping in the middle or on the western side of the gulf a strong southerly set will be experienced. After making Galera and clearing the San José bank, the navigation between the Pearl islands and the main is clear and easy, with the advantage of being able to anchor should the wind fail or the tide be unfavorable. As a rule, this passage should be taken, but with a strong southerly wind the navigator is tempted to run up the bay, in which case he should keep on the western shore of the Pearl islands, where less current will be found, and anchorage should the wind fail, an event always to be expected in these regions. Between Chirambira point and cape Corrientes the land is low and faced with shoals, caused by the numerous rivers that have their outlets on this part of the coast; but after passing cape Corrientes it may be approached fairly close except off Solano

point, where some rocky shoal patches extend to the seaward, as the coast is in general bold-to. Care, however, should be taken not to run into the calms caused by the high land, as it is difficult to get off into the breeze again, and the swell sets inshore, where there may be no anchorage until close to the rocks.

In beating up the gulf of Panama in the fine season, the eastern passage is to be preferred, as, with one exception (San José bank), it is free from dangers, the water is smooth, and a regular tide enables more northing to be made than would be possible in most cases against the strong current and short high sea which at this season prevail in the middle or on the western side of the gulf. During the rainy season, when the land may be shut in by the heavy rains, a straight course up the bay is preferable to becoming entangled with the islands, the current generally following the direction of the wind, which is from the southward.

Bound from Panama.—The great difficulty, however, is the passage out from Panama bay. Pizarro, the first to attempt this, in November, 1525, after beating about for seventy days, was forced to return to the river Chiman.

The best plan for all sailing vessels, whether bound for ports north or south of Panama, is to push to the southward and gain the southeast trade; by so doing they will not only avoid the doldrums and vexatious winds, but will have the additional advantage of salubrious weather, with the sea at a temperature of 75° instead of 83° F. Between January and April it may be better for north-bound vessels to cross the line between the Galapagos islands and the coast before pushing westward, keeping south of the line until westward of 105° W., when a course may be shaped for 10° N. and 120° W., in which track they will probably find the northern trade. This will generally prove far preferable to encountering the vexatious weather met with at this season north of the Galapagos.

The passage to the northward has been made by keeping close inshore after passing cape Mala, and navigating by the land and sea breezes; but this should be attempted only by vessels that are well found and manned, unless bound to the ports of Central America, when it is their only route.

The passage to the westward during the rainy season is a most tedious affair; calms, squalls, contrary winds and currents, a heavy swell, and extreme heat, as well as an atmosphere laden with moisture and rain, are the daily accompaniments. It often occurs that 20 miles of westing are not made in a week, and it is only by the industrious use of every squall and slant of wind that the passage can be made.

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Col. Oswald H. Ernst
Alfred Noble
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